

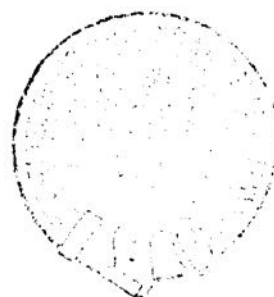
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HANDBOOK
FOR THE
2.95 INCH Q.F. MOUNTAIN GUN,
MARK I.
MULE EQUIPMENT.



1906.



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N.B.—This book is corrected up to May, 1906. Any alterations which may be suggested should be forwarded direct to Chief Inspector, Royal Arsenal, Woolwich.

Q.F., 2.95-INCH MOUNTAIN GUN.

DESCRIPTION.

| | | | | | |
|------------------------------|----|----------------------------------|--------|----|---------------------------------|
| Material | .. | .. | .. | .. | Steel. |
| Weight, with breech fittings | .. | .. | .. | .. | 236 lb. |
| Length, total | .. | .. | .. | .. | 35.85 inches. |
| Bore | .. | calibre | .. | .. | 2.953 " |
| | | length (to face of breech screw) | .. | .. | 31.6 inches = 10.7 calibres. |
| Rifling.. | { | system | .. | .. | Polygroove, plain section. |
| | | length | .. | .. | 24.02 inches. |
| | | twist | .. | .. | Uniform, 1 turn in 25 calibres. |
| | | grooves | number | .. | 30. |
| | | | width | .. | 0.23 inch. |
| | | | depth | .. | .023 " |
| Firing mechanism | .. | .. | .. | .. | Percussion. |

Gun.

(Plates I to V.)

The gun is of steel. Rings are formed on the chase which fit the interior of the cradle and retain the gun in the central position longitudinally; a steel screw in the underside of the gun towards the breech serves as a guide. Lugs are provided on each side at the breech for the attachment of the hydraulic buffers of the mounting.

The chamber is slightly coned throughout its length.

Catches for retaining the piston rods of the hydraulic buffers are attached to the lugs on the sides of the gun.

An eyebolt for lifting is screwed into the upper side of the gun at the breech.

Breech closing Mechanism.

The breech is closed by a steel screw, tapering towards the rear. Segments of the screw thread are removed from opposite sides of the screw, and the breech opening of the gun being prepared in a corresponding manner, admits of the screw being locked by the fourth of a turn.

The breech screw is supported when withdrawn from the gun by a steel carrier hinged to the right side of the gun at the breech. The screw is attached to the carrier by means of screw threads on the rear end, which engage with corresponding screw threads in the carrier.

Hinged to the carrier is a breech mechanism lever provided with bevel teeth which engage with corresponding teeth on the rear face of the breech screw, so arranged that when the lever is pulled to the right the first movement of the lever unlocks the breech screw, and on continuing the motion the screw and carrier are swung into the loading position.

The breech mechanism lever is retained in the closed position by means of a catch and flat spring.

Firing Mechanism.

The firing mechanism is so arranged as to prevent the gun being fired before the breech screw is locked in the gun, and the breech mechanism lever home.

A striker with main spring for percussion firing is fitted through the centre of the breech screw, and retained in position by a guide block on the carrier. The striker is automatically cocked in opening the breech, and is retained in the cocked position by means of a trigger-sear, which is pivoted in the carrier. A cocking handle is provided, by means of which the striker can be pulled into the cocked position without opening the breech. A trigger is fitted to the left side of the breech, and engages with the trigger-sear when the screw is locked in the gun. A loop is provided on the trigger for the attachment of the firing lanyard.

Extractor.

The extractor is of steel, and is hinged to the right side of the gun. On the inner end are two arms, which clip the rim of the cartridge when in the gun, the outer end forming a lug, by means of which the extractor is automatically actuated in opening the breech.

To remove the Breech Fittings.

Before commencing to remove the fittings, the breech should be closed, and the trigger pulled so as to release the main spring.

Striker, Main Spring, and Breech Mechanism Lever.

Remove the keep pin of the breech mechanism lever hinge bolt, press in the guide block, and withdraw the hinge bolt, when the breech mechanism lever, guide block, striker, and main spring can be removed. Replace the breech mechanism lever and hinge bolt, open the breech, then remove the lever and bolt.

Breech Screw, Trigger-Sear, and Retaining Catch.

Press in the retaining catch clear of the breech screw, and unscrew the breech screw from the carrier. The trigger-sear and retaining catch with spiral spring can then be withdrawn from the carrier.

Carrier.

Remove the keep pin from the carrier hinge bolt, and withdraw the hinge bolt and carrier.

Extractor.

Remove the keep pin from the extractor hinge bolt, and withdraw the hinge bolt and extractor.

Trigger.

Withdraw the keep pin and remove the outer portion of the trigger, the other portion of the trigger will then be withdrawn from the interior of the gun.

NOTE.—A torsional spring was originally provided on the trigger; should the spring be found on any existing gun, the trigger will be removed as described above and the spring withdrawn, the trigger being then re-assembled in the gun without the spring.

To Replace Fittings.

The fittings are replaced in the reverse order.

When inserting the breech screw in the carrier, care must be taken, before commencing to screw in, to hold the breech screw squarely against the face of the carrier, the recess in the screw for the reception of the retaining catch being placed immediately below the recess in the carrier for the trigger-sear.

CARE AND PRESERVATION OF Q.F. 2.95-INCH GUN AND FITTINGS.

See "*Regulations for Care and Preservation of War Matériel, and for Magazines.*"

Special Instructions not in the above-mentioned Regulations.

Care should be taken that the striker is kept in good working order and in correct position. The protrusion of the striker through the firing hole in the breech screw should be between .15-inch maximum and .13-inch minimum. A gauge for measuring the protrusion is provided, and should be used as follows:—

Remove the breech screw and striker from the carrier and insert the striker in the breech screw, care being taken that the recess in the screw is free from grit, and that the striker is kept pressed home as far as it will go when applying the gauge. Apply the gauge to the front face of the breech screw. In the event of the protrusion not being within the above-mentioned limit, the striker must be adjusted or exchanged.

The breech fittings should be kept clean, oiled or greased, and in good working order; all working surfaces must be well lubricated, the fittings being taken off sometimes for this purpose, especially after firing.

All fittings of the gun should be treated with care; violence and jerks should be avoided, and no unnecessary force should be employed.

The breech fittings should work easily and be free from cracks and burrs; the latter can be removed by filing, but this must be done carefully so as not to permanently damage the fittings. Should a crack be observed in a breech fitting, such fitting should be exchanged.

The threads of the breech screw should be free from burrs. Should the screw not work easily, the defect may often be remedied by careful filing, but no portion of the thread should be cut away to remove a crack.

The breech and muzzle should be kept covered by the leather covers for the gun, to prevent dust and grit getting into the interstices of the breech fittings and bore of the gun.

When examining the breech fittings, care must be taken to test the concentricity of the striker or firing pin; this can be done by means of an empty cartridge in the gun. If the empty cartridge used be a fired one, the existing indent in the cap must be first filled up with grease. If the indent made in testing for concentricity is found to be so much eccentric as to be likely to cause misfires, further examination should be made to ascertain the portion of the mechanism in fault, and steps taken to have it repaired or exchanged.

When mounting or dismounting the gun, care must be taken to see that the guide on the gun, and the corresponding recess in the cradle, are free from burrs. In the event of the gun or cradle being burred at these points, the burr should be carefully removed by filing.

CARRIAGE, MOUNTAIN, Q.F. 2.95-INCH.

The carriage consists generally of two side brackets forming the trail, cradle, and elevating gear, mounted on an axletree having wheels three feet in diameter.

The trail consists of two outside plates of steel joined together by a shoe, a central bracket of angle steel, and three transoms. The shoe is provided with a spade on the under side, to check the recoil on the ground; it also carries a socket in which can be fitted a handspike for traversing. The front transom is provided with bearings through which the cradle axis bolt passes; this bolt and the wheel axletree are cylindrical, with flats cut on them so that they can only enter their bearings at a certain angle, and then when in position the bolt is turned through 90° and thus secured.

The main part of the cradle is cylindrical, and supports the gun from the breech to within a few inches of the muzzle; it is provided with two hydraulic buffers, one on each side, the piston rods of which work to the rear and are secured to lugs on the gun by interrupted screws; in addition a spring catch on the gun is fitted over the end of each rod to prevent it from turning.

The force of recoil is checked in the buffers by means of the liquid when passing through grooves from one side of the pistons to the other. The width of these grooves varies, so as to maintain a constant pressure during the whole length of recoil, which is 14 inches.

The gun is returned to the firing position by means of two spiral springs placed round the piston rods.

In place of trunnions there are two lugs underneath the cradle,

through which passes the cradle axis bolt, and by means of which the cradle is secured to the trail.

The cradle is side sighted on the left side.

The fore sight consists of a pyramidal steel block, which is fitted to a bronze bracket attached to the upper side of the cradle near the front end. The sight is secured in the bracket by means of a dove-tail and fixing screw.

The tangent sight consists of a steel sight bar, the upper part of which is \perp section, the lower end being made cylindrical, so as to fit the socket for its reception on the rear of the cradle. The sight bar is provided with a movable crosshead provided with a notched deflection leaf and traversing screw capable of giving $1\frac{1}{2}$ degrees deflection right and left. The cross head is adjusted on the sight bar by means of a milled head and pinion, which gears with a rack on the rear face of the sight bar. An aluminium range strip, engraved with a yard scale graduated to hundreds of yards for 4,000 yards range with a full charge for shrapnel shell, is attached to the rear face of the sight bar by fixing screws.

A leather pocket is provided on the upper side of the cradle for the reception of the tangent sight when not in use.

A spare tangent sight per gun is fitted with a range strip for double shell. It is carried in the case spare parts.

A leather cap is provided for protecting the fore sight when travelling.

The elevating gear allows of 25 degrees elevation, and 10 degrees depression. It consists of a handwheel, two bevel wheels, a worm spindle, and a quadrant or toothed segment. The hand and bevel wheels are supported in the front transom; the lower end of the worm spindle bears in a socket provided with trunnions, which rest in bearings in the same transom.

The head of the quadrant engages in a socket at the rear of the cradle, and is held there by a joint pin; at the other end of the quadrant is an arm with a bearing, through which the axis bolt of the cradle passes. In order to keep this quadrant in a central position, its arm is fitted transversely with a small cross bar, and near where this arm joins the toothed segment is another cross piece, to each end of which a spiral spring is connected, these springs being fastened at their other extremities to the front transom; the function of these springs is to maintain as near as possible a uniform weight on the elevating gear when it is being worked.

Two arrows are cut on the worm to indicate when the gear is in the correct position to allow of the removal of the cradle for dismounting. On dismounting, the whole of the elevating gear remains on the trail.

The wheels are special No. 72, 36 inches diameter, the track 32 inches. When firing, the wheels can be attached to the trail with check ropes, to prevent their revolving to the rear. This arrangement, together with the spade already described, greatly reduces the recoil.

An oil can is carried between the side brackets.

Dimensions, &c.

| | |
|--------------------------------|----------------------|
| Height to axis of gun | 2 feet 2 inches, |
| Length (with gun) | 6 „ $4\frac{1}{2}$ „ |
| Maximum width | 3 „ $6\frac{1}{2}$ „ |
| Weight of carriage with gun .. | 7 cwt. 2 qrs. 24 lb. |

HANDSPIKE, TRAVERSING.

The handspike, which is of tubular steel, is coned at one end to suit the socket on the trail to which it is secured when in position by a key; the other end is fitted with a metal socket for use in compressing the hydraulic buffer springs.

Dimensions—2.22 inches diameter \times 40.55 inches long.

DISMOUNTING THE GUN AND CARRIAGE.

To dismount the gun, take the tangent sight out of its socket, and place it in the pocket provided on the side of the cradle. Pull back the spring catches clear from the end of the piston rods, then turn the two piston rod handles together upwards as far as they will go. The gun is now free, and can be withdrawn by supporting the breech and pulling to the rear.

To dismount the cradle, put the cradle at extreme depression by turning the handwheel as far as it will go, then pressing in the spring latch on the handle of the cradle axis bolt, turn the handle to the rear as far as it will go (that is, a quarter of a circle); then slightly work back the gear until the arrow heads on the worm point each to the outer edge of one of the teeth of the toothed segment; remove the elevating joint pin, and the cradle is now free to be lifted off the trail.*

If required to remove the pistons from the buffers, first remove the gun as described, then depress the cradle about 5 degrees, unscrew the filling and emptying plugs to let the oil run out; next insert the tool, assembling springs, in the filling hole to take the weight of the spiral spring, unscrew the front cap and remove the leather washer; take out the set screw from the piston head, then unscrew and remove the piston head; now take the traversing handspike, and by means of its hollow end compress the spring enough to withdraw the buffer key, then remove the spring and withdraw the piston rod to the rear.

To detach the axle and wheels, support the front of the trail by the two handles and turn the axle lever to a vertical position, first pressing in the pivoted lever in the handle so as to release the catch; the trail is then free and can be lowered to the ground. The wheels can be dismounted in the usual way by removing the linch pins and drag washers.

MOUNTING THE GUN AND CARRIAGE.

Insert the piston rod from the rear, taking care that the packings and glands are in position; then enter the spiral spring from the muzzle end of cradle around the rod; by means of the hollow end of the handspike compress the spring sufficiently to allow the tool, assembling springs, when pushed down the filling hole, to engage the last coil but one, remove handspike and screw on the piston head, securing it in position with the set screw; now replace the leather washer, tightly screw up the front caps, replace the emptying plug, fill the buffers with $6\frac{3}{4}$ pints of oil, and replace the filling plugs.

* On no account should the elevating gear be worked while the cradle is dismounted; the handwheel should not be turned until the cradle is securely fastened in position.

See that the elevating gear is in the correct position at extreme depression, and drop the cradle axis bolt in the bearings provided for it in the front transom; then turn the axis handle forward till it is locked by the spring latch, lower the rear end of the cradle on to the head of the elevating quadrant, and secure it with the elevating joint pin.

Lay the cradle horizontally, see that the piston rod handles are vertical, place front collar of gun on the bridge at the rear end of the cradle and push the gun right home; the ends of the piston rods will then enter the holes in the lugs of the gun, so that on turning both handles together outwards 90 degrees, they are securely locked, and the gun is ready for firing.

AMMUNITION.

Cartridges.

(Plates VI to IX.)

| Description. | Marks of— | | Weight of charge. | | Size of cordite. |
|----------------------------------|------------------|------------|-------------------|----------|------------------|
| | Projectile. | Cartridge. | Ballistite. | Cordite. | |
| | | | oz. drs. | oz. drs. | |
| Cartridges, filled, fitted with— | double shell { | I | 5 0 | — | — |
| | | II | 5 0 | — | — |
| | | III | — | 5 0 | — |
| | shrapnel shell { | I | 5 6 | — | 5 |
| | | II | — | 5 4 | |
| | | III | — | 5 4 | |
| | case shot { | I | 5 4 | — | — |
| | | II | — | 5 12 | |
| | star shell { | I | 3 0 | — | 3½ |
| | | II | — | 2 12 | |

Case, empty.

(Plate VI.)

The cases are made of brass, solid drawn, slightly tapered towards the mouth, and recessed in the base to take a percussion cap. A brass safety clip covers the cap to protect it, and is not to be removed until the cartridges are placed in the carriers.

Mark I fired cases are, on repair, converted to take the same cap as the Mark II case, and are known as Mark I*.

The Mark II differs from the Mark I in the fire hole being smaller, and in the cap, which is similar to those for 6-pr. and 3-pr. Q.F. cartridges.

Mark III differs from Mark II in the base being screwed and recessed to receive a percussion primer.

Length of case 6.265 inches,
Weight „ „ 1 lb. 10¼ ozs.

Charges.

The ballistite charge is contained in a shalloon bag, choked with silk twist, and kept in position in the cartridge case by a paper cylinder.

The igniter is formed by a disc of shalloon, sewn on the bottom of the shalloon bag, and contains 4 drams of F.G. powder.

The cordite charges (*see* Plate VII) consist of circular bundles of cordite cut to the following lengths:—

For—

| | | | | inches. |
|---------------------------|----|----|----|---------|
| Double shell cartridges | .. | .. | .. | 1.3 |
| Shrapnel shell cartridges | .. | .. | .. | 1.35 |
| Case shot cartridges | .. | .. | .. | 1.3 |
| Star shell cartridges | .. | .. | .. | 0.8 |

Each charge is contained in a shalloon bag, and is primed with one dram of guncotton yarn stemmed in a pocket formed by a disc of shalloon sewn to the bottom of the bag.

The paper cylinder, to hold the charge in position in the cartridge case, consists of a perforated cylinder with two perforated discs attached to each end.

Cartridge, saluting.

(Plate VIII.)

The cartridge consists of a service case, fitted in the base with the Mark III, 6-pr. or 3-pr. primer.

The charge of 12-oz. blank L.G. is contained in a No. 1 class silk cloth bag, with two .35-inch braids, the whole being enclosed in a felt jacket. The mouth of the cartridge is closed by means of a .5-inch felt disc, to which is stitched a felt washer.

Cartridge, drill.

(Plate IX.)

The cartridge consists of a brass case, fitted with a hollow wooden shell fixed to the neck of the case by three brass screws.

The base of the cartridge is fitted with a dummy primer, containing a spiral spring and indiarubber pad for the firing pin of the striker to impinge against.

Three holes .5 inch diameter are drilled through the base, and three through the wall of the case, to facilitate identification.

Dimensions.

| | | | | inches. |
|-------------------------------|----|----|----|---------|
| Length (maximum) | .. | .. | .. | 15.65 |
| Diameter at base (maximum) | .. | .. | .. | 3.407 |
| Diameter over shell (maximum) | .. | .. | .. | 3.008 |

Primer, percussion.

The body of the primer is made of metal, screwed externally to fit the cartridge case, and fitted with a percussion cap, similar to that used with 6-pr. and 3-pr. ammunition.

Two recesses are cut in the head of the primer to allow of the use of the "Key, inserting and removing percussion primer."

Key, inserting and removing percussion primer.

The key is made of steel, one end being bent over, and having two projections formed on it to fit the recesses in the percussion primer.

| | | | |
|-------------------------|----|----|--------------|
| Length of key (maximum) | .. | .. | 7.22 inches. |
|-------------------------|----|----|--------------|

Carrier, ammunition.

The carrier is constructed of brass tubes fixed in a skeleton steel frame, and will hold three rounds of ammunition. It is provided with a felt-lined lid, which is secured by a hasp and turnbuckle. A leather handle is attached for lifting.

| | | |
|------------------------------------|------|-----------------|
| Weight, empty | lbs. | ozs. |
| „ filled with shrapnel shell | 54 | 0 |
| „ „ „ case shot.. .. . | 61 | 5 $\frac{3}{4}$ |

Projectiles.

(Plates X to XV.)

| Description. | Mark. | Length. | Weight. | Bursting charge. | Diameter. | |
|----------------------------|----------|---------|--------------------|------------------|------------|------------|
| | | | | | Over body. | Over band. |
| | | inches | lb. oz. | ozs. | inches | inches |
| Shells, { double, common { | I | 14·124 | 18 0 | 10 $\frac{1}{2}$ | 2·941 | 3·017 |
| | II & III | 14·224 | 18 2 $\frac{1}{2}$ | 15 | | |
| | I | 8·78 | 12 8 $\frac{1}{2}$ | 2 $\frac{1}{2}$ | | |
| | II | 9·075 | 12 8 | 1 $\frac{1}{2}$ | | |
| | I | 8·78 | 8 4 | 1 dram | | |
| | II | 8·78 | 8 3 $\frac{1}{2}$ | 3 drams | | |
| Shot, case | I | 11·95 | 15 0 | — | 3·008 | 3·017 |
| | II | 10·45 | 15 0 | — | | |

Double shell.

(Plates X and XI.)

The double shell are made of iron, with a solid truncated head. Near the base a groove is turned for the driving band; three ribs project on the groove. The Mark I is screwed in the base to take the fuze, percussion, base, Armstrong, No. 9, and the Marks II and III to receive the fuze, percussion, base, medium, No. 12.

Mark III differs from Mark II in the ribs in the groove for driving band being “waved.”

Shrapnel shell.

(Plates XII and XIII.)

The body of the Mark I shell is made of forged steel, and is formed at the base to receive the bursting charge. The head, which is of brass, is screwed to the body, and fitted to take the “fuze” T. and P., No. 56 or No. 60.

Near the base a groove is turned for the driving band; three ribs project on the groove.

The shell contains about 175 bullets (42 per lb.), supported in the body of the shell by a steel diaphragm, which is placed over the

powder chamber and axially bored to admit of the flash passing through to the bursting charge. The interstices between the bullets are filled in with resin.

A central tube of gunmetal in two parts is fitted to the shell, the top end being screwed to receive the "primer, shrapnel shell, Mark III."

Mark II differs from *Mark I* in the head being of steel with a metal fuze socket. The number of bullets is about 203 (41 per lb.). The ribs on the groove for driving band are waved, and have three chisel cuts across them to prevent the band turning on the shell.

Star shell.

(Plate XIV.)

The body of the *Mark I* shell is made of steel, and has a recess in the base to receive a bursting charge of 1 dram R.F.G.² powder, contained in a shalloon bag.

The head of the shell is made of gunmetal, formed with a fuze socket tapped to the general service fuze hole gauge, and attached to the body by four brass screws, and four steel twisting screws. A brass central tube perforated with fire holes (to admit the flash to the priming of the stars) is fixed to the bottom of the fuze socket by a nut, and into a perforated steel diaphragm over the bursting charge.

The shell is lined with a paper cylinder, and contains 10 stars in two tiers (five in a tier), over which is placed a felt washer to prevent the stars from jolting against the head.

A groove is turned near the base for the driving band; three waved ribs project on the groove with three chisel cuts across them to prevent the band turning on the shell.

The *Mark II* shell differs from *Mark I* as follows:--

1. The head is of steel.
2. The brass central tube fits into the bottom of the fuze socket and screws into a wrought-iron disc over the bursting charge.
3. The tiers of stars are separated by an iron disc perforated with five fire holes.
4. The bursting charge consists of 3 drams of R.F.G.² powder in a shalloon bag, threaded with quickmatch.
5. The driving band is not cannellured, but has serrations on the front portion.

Case shot.

(Plates X and XV.)

The case of the *Mark I* case shot is made of brass, with a segmental lining of sheet iron in three pieces. A brass disc forms the base and supports the bullets. The case contains 355 bullets, the interstices being filled up with clay and sand. A driving band is formed by two circumferential projections of the outer case.

The case of the *Mark II* shot is made of tin, in three pieces soldered together, with a segmental lining of steel in six pieces.

The base is of forged steel, closed at the bottom with two steel discs, between which a tin disc is placed and soldered to the base. It is fitted with a copper driving band, under which the end of the tin case is pressed.

The top is closed by a wood block, covered with a tin cap soldered to the body.

The case contains about 404 bullets (41 per lb.).

Boxes, pack transport, ammunition.

No. 1 box is of wood and fitted internally to hold six shrapnel shells or case shot. The lid of the box is secured by a hasp and turnbuckle. Links are secured to the rear of the box by which it is attached to the cradle.

No. 2 box is generally similar to the No. 1, and is fitted internally to hold four double shell.

Dimensions.

| | | | | inches. |
|-----------|----|----|----|---|
| No. 1 box | .. | .. | .. | $23\frac{3}{4} \times 18 \times 7\frac{1}{2}$ |
| No. 2 box | .. | .. | .. | $20.35 \times 21.375 \times 7.625$ |

FUZE, TIME AND PERCUSSION, No. 56, MARK IV.

(Plate XVI.)

The fuze consists of the following parts (made of gunmetal, except where otherwise stated), viz.:—Body, detonator plug with detonator, percussion pellet, brass spiral spring, base plug, brass safety pellet, brass ball, composition ring, dome, brass washer, cap, two safety pins, and two leather washers.

The *body* is screwed at the lower end to G.S. fuze hole gauge, and is bored from the bottom to receive a percussion pellet and base plug. Two holes are bored beyond the recess for percussion pellet, one for the detonator plug, the other for the safety pellet.

The *detonator plug* is screwed on the outside and filled with a detonator covered with a brass disc.

The hole bored for the detonator plug is continued above it to form a small magazine filled with F.G. powder. In the top of the body is bored a recess to contain a perforated pellet of pressed pistol powder, which communicates with the magazine by a hole bored at right angles to the axis of the fuze. The stem on the body is screwed on top to take the cap, two grooves being cut in the top end of stem to receive the feathers on the brass washer. A groove is cut in the top face of body, close to the stem, and half way round it, and a gas escape hole bored obliquely through the body into the groove. A small tablet of fine white paper is secured with shellac to the body of the fuze over the perforated powder pellet, and over it two washers of fine white paper and calf skin are secured with shellac, a hole being cut through the washers and tablet immediately over the powder pellet.

The *percussion pellet* has a cut in the side for the safety pellet and ball to fall into when set in action. A hole is made transversely through the pellet and fitted with a brass retaining bolt, held in position by a brass spiral spring. The pellet contains a powder charge of F.G. powder. A small set screw in the wall of the body fits into a slot in the percussion pellet to prevent it from turning in flight. A spiral spring of brass wire is placed between the percussion pellet and detonator plug.

The *base plug* contains a perforated pellet of pressed powder, secured by a brass washer spun over on top, and is closed at the bottom by a shallow disc and brass washer spun in. The plug is fixed by stabbing in three places.

The *safety pellet* has a slot cut in the side to clear the brass ball, and is suspended in the body by a thin copper wire passing through it. A hole is also bored in the upper part of the pellet and body of fuze for the safety pin to pass through.

The *composition ring* has a chamber on one side and three projections on the inside to keep it concentric with the stem of the body. The chamber has a hammer with a steel needle suspended in it by a copper wire over a patch of detonating composition. A safety pin also passes through the hammer and chamber. The ring has a groove on the underside filled with composition and connected with the chamber by a lighting hole. The outside of the ring is graduated from 0 to 18, each division being subdivided into halves and quarters, with a broad arrow at the point where the groove is interrupted by a bridge soldered in.

The *dome* is made of sheet brass.

The *washer* is made of sheet brass with two feathers, which fit into featherways cut in the top of the stem. When screwing up the cap the washer remains stationary, thus preventing the dome from turning and altering the setting of the fuze.

The *cap* is made of gunmetal, hexagonal in form, and screws on the stem of the body.

The fuze is stamped **T** on the composition ring close to the time safety pin, and **P** on the body close to the percussion pin. The time pin loop is scarlet.

The fuze should be set *before* the safety pins are withdrawn.

To set the time arrangement, the cap is loosened with the "key, fuze, universal," and the ring moved round until the graduation ordered is exactly in line with the arrow or triangular mark on the body; the fuze is then clamped by screwing down the cap as tightly as possible, care being taken that the ring and dome have even bearings.

If the fuze is required to act as a percussion fuze only, the **P** pin should be withdrawn and the **T** pin left in position; otherwise both pins should be withdrawn; but this should not be done till the moment of loading.

Action.—On discharge, if the time safety pin has been withdrawn, the hammer sets back, shearing the suspending wire and igniting the time ring, which burns until it comes over the detonator and the pellet, and so flashes down through the radial magazine, detonator pellet, and base plug, and into the shell.

If the percussion pin has been withdrawn, the safety pellet sets back, shearing the suspending wire, and the brass ball falls down into the space over the safety pellet. The centrifugal bolt, owing to the rotation of the shell, is withdrawn, the percussion pellet is free

to move forward on impact and ignite the detonator, which flashes through the percussion pellet and base plug into the shell.

At rest it burns about 13 seconds.

These fuzes are issued 1 in a tin cylinder.

FUZES, TIME AND PERCUSSION, Nos. 60 AND 60C, MARK II.

(Plate XVII.)

The No. 60 fuze consists of the following parts (made of gun-metal, except when otherwise stated), viz.:—Body, detonator plug with detonator, percussion pellet with needle plug, brass spiral spring, base plug, brass safety pellet, brass ball, top and bottom composition rings, dome, brass washer, cap, retaining bolt, two safety pins, leather washer, two calf skin washers, and a cupro-nickel setting pointer.

The *body* is screwed at the lower end to G.S. fuze hole gauge, and is bored from the bottom to receive a detonator percussion pellet, safety pellet, brass ball, spiral spring, and centrifugal bolt. It is also screwed to take the detonator plug and base plug.

The hole bored for the detonator plug is continued above it to form a small magazine filled with F.G. powder. In the top of the body is bored a recess to contain a perforated pellet of pressed pistol powder, which communicates with the magazine by a hole bored at right angles to the axis of the fuze. The stem on the body is screwed on top to take the cap, two grooves being cut in the top end of stem to receive the feathers on the brass washer, and two brass guide pins screwed into the side to fit into two slots cut in the top composition ring to prevent it turning. A small tablet of fine white paper is secured with shellac to the body of the fuze over the perforated powder pellet, and over it two washers of fine white paper and calf skin are secured with shellac, a hole being cut through the washers and tablet immediately over the powder pellet.

The *percussion pellet* has a rounded slot down the side for the safety pellet and ball to fall into when set in action. A hole is made transversely through the pellet and fitted with a brass retaining bolt, held in position by a brass spiral spring. The pellet is of pressed F.G. powder with loose powder on top. A small set screw in the wall of the body fits into a slot in the percussion pellet to prevent it from turning in flight. A spiral spring of brass wire is placed between the percussion pellet and detonator plug.

The *base plug* contains a perforated pellet of pressed powder, secured by a brass washer spun over on top, and is closed at the bottom by a shallow disc and brass washer spun in. The plug is fixed by stabbing in three places.

The *safety pellet* has a slot cut in the side to clear the brass ball, and is suspended in the body by a thin copper wire passing through it. A hole is also bored in the upper part of the pellet and body of fuze for the safety pin to pass through.

The *top composition ring* is made with a central hole to fit the stem on the body, having two slots cut through the side to fit over the guide pin in the stem to prevent the ring from turning. A projection

is made on top which is bored out to form the hammer chamber. The upper part is reduced in diameter to form a seating for the dome. The chamber has a hammer with a steel needle suspended in it by a copper wire over a patch of detonating composition. A safety pin also passes through the chamber and under the hammer. The ring has a groove on the underside filled with composition and connected with the chamber by a lighting hole. A fire escape hole is bored obliquely through the ring into the composition groove near the lighting hole, closed by a brass disc secured by Pettinan's cement and four punch dabs. The ring is graduated from 0 to 44 and marked with 88 divisions, and an arrow to denote the safety point.

The *bottom composition ring* has three projections on the inside to keep it central when placed on the stem of the body. A groove is made in the underside and filled with detonating composition. A hole, filled with a perforated pellet of pressed pistol powder, communicates with the top ring and body. A fire escape hole through the side communicates with the composition groove.

A setting pointer is fixed by a screw to the ring and blacked.

The *dome* is made of sheet brass.

The *washer* is made of sheet brass with two feathers, which fit into featherways cut in the top of the stem. When screwing up the cap the washer remains stationary, thus preventing the dome from turning and altering the setting of the fuze.

The *cap* is hexagonal in form, and screws on the stem of the body.

The fuze is stamped **T** on the top composition ring close to the time safety pin, and **P** on the body close to the percussion pin.

The fuze should be set *before* the safety pins are withdrawn.

To set the time arrangement, the cap is loosened with the "key, fuze, universal," and the bottom ring moved round until the setting pointer is exactly in line with the graduation ordered on the top ring; the fuze is then clamped by screwing down the cap as tightly as possible, care being taken that the ring and dome have even bearings.

If the fuze is required to act as a percussion fuze only, the **P** pin should be withdrawn and the **T** pin left in position; otherwise both pins should be withdrawn; but this should not be done till the moment of loading.

Action.—On discharge, if the time safety pin has been withdrawn, the hammer sets back, shearing the suspending wire and igniting the top time ring, which burns until it reaches the zero of the bottom ring, which then lights and burns back in the opposite direction until the setting mark of the fuze, and then flashes down through the radial magazine, detonator pellet, and base plug, and into the shell.

If the percussion pin has been withdrawn, the safety pellet sets back, shearing the suspending wire, and the brass ball falls down into the space over the safety pellet. The centrifugal bolt, owing to the rotation of the shell, is withdrawn, the percussion pellet is free to move forward on impact and ignite the detonator, which flashes through the percussion pellet and base plug into the shell.

At rest it burns about 20 seconds.

The No. 60c fuze is the No. 56 converted to No. 60 pattern.

These fuzes are issued one in a tin cylinder.

FUZES, PERCUSSION, BASE.

(Plates X and XVIII.)

The base fuze (Vickers) (Plate X) used for the Mark I double common shell is constructed with a pressure plate at the base, connected to a stem which is constructed to retain in the safety position a pellet containing a steel needle. On discharge the plate is crushed in, and the stem is driven forward, thereby liberating the pellet and needle, so that the latter is free to move forward on impact against a detonating cap in the top of the fuze; a small spiral spring is fitted between the needle and the cap to prevent any chance of premature explosion from the pellet creeping forward during flight.

Fuze, Percussion, Base, Medium, No. 12, Marks I to III.

(Plate XVIII.)

The Mark I fuze consists of the following parts:—Body, *a*; needle pellet, *b*; centrifugal bolt, *c*; pressure-plate, *d*; with spindle, *e*; and nut, *f*; screwed cap with detonator and plug, *g*; phosphor bronze spring, *h*; brass spring, *k*; and four brass screws.

The body is made of manganese bronze, screwed outside twelve threads per inch left hand to fit the fuze hole of the shell, and having a hole bored through the side, to take a small brass spring which works against the centrifugal bolt; the hole is closed by a brass screw plug. The base of the fuze, which is recessed and undercut round the edges, is closed by the copper pressure plate, which is secured in position by being pressed into the undercut portion of the recess. The head of the fuze is closed by a cap screwed into the body, and containing a detonator in the centre of the underside, the body of the cap being bored out and screwed to take the plug.

The plug, which forms a magazine, contains a compressed pellet of $10\frac{1}{2}$ grains of R.F.G.² powder, and is screwed into the cap. It has four holes bored through the head to communicate the flash to the interior of the shell. The detonator communicates with the magazine by fire holes through the metal above it.

The interior of the fuze contains the spindle, needle pellet, centrifugal bolt, and spring.

The pellet is hollow, the bolt passes through the lower end, and the upper is reduced in diameter to form a seating for the spring, and screwed internally to take the needle plug. The bottom of the spindle is screwed into a boss in the centre of the pressure plate, and the head has a brass nut screwed on to it, which locks into the centrifugal bolt. The bolt is hollow at one end, and has a projection fitted into a slot in the side of the body of the fuze.

The action of the fuze is as follows:—On discharge the pressure plate is driven in, carrying the spindle with it; the head of the spindle being forced down, releases the centrifugal bolt and leaves it free to move. The rotation of the shell causes the bolt to be spun out, compressing the spring in rear, and leaving the needle pellet free to move forward on impact when the needle strikes the detonator and fires the fuze.

The head is painted red.

Mark II differs from Mark I in having a perforated steel protecting plate fitted over the pressure plate.

Mark III differs from Mark II in the protrusion of the centrifugal bolt being increased.

Weight, 1 lb. 4 $\frac{3}{4}$ oz.

These fuzes are issued one in a tin cylinder.

NOTE.—*Shells fitted with this fuze must never be placed point to base.*

FUZE, DRILL, T. AND P., NO. 60.

The *Mark I* fuze resembles the service pattern, but is issued empty and provided with special safety pins, which can be withdrawn and replaced as required. Steel washers are fitted under the cap instead of brass ones, as in the service fuze. It is stamped "DRILL," and the dome and cap are bronzed to facilitate identification.

Mark II fuze differs from *Mark I* in having a setting pointer instead of a blackened notch on the time ring. The pointer is of cupro-nickel, blackened, and fixed to the fuze by a screw.

RANGE TABLE for 2.95-inch Q.F. Gun, Mark I.

Projectile, shrapnel shell, 12½ lbs. Muzzle velocity 920 f.s.

Charge—Ballistite. Published March, 1902.

| RANGE. | Angle of Elevation. | | Angle of Descent. | | Time of Flight. | Fuze Scale | |
|--------|---------------------|----|-------------------|----|-----------------|-------------------------------|-------------------------------|
| | | | | | | for T. and P. No. 56 fuze. | for T. and P. No. 60 Fuze. |
| yards. | ° | ' | ° | ' | seconds. | | |
| 100 | 0 | 21 | 0 | 21 | 0.33 | 1 | 1 |
| 200 | 0 | 38 | 0 | 41 | 0.66 | 1 | 1 |
| 300 | 0 | 56 | 1 | 02 | 1.00 | 1½ | 2 |
| 400 | 1 | 15 | 1 | 24 | 1.34 | 2½ | 2½ |
| 500 | 1 | 34 | 1 | 46 | 1.69 | 2½ | 3½ |
| 600 | 1 | 54 | 2 | 08 | 2.04 | 3½ | 4½ |
| 700 | 2 | 14 | 2 | 31 | 2.39 | 3½ | 5 |
| 800 | 2 | 35 | 2 | 54 | 2.74 | 4½ | 5½ |
| 900 | 2 | 56 | 3 | 18 | 3.10 | 4½ | 6½ |
| 1000 | 3 | 17 | 3 | 42 | 3.46 | 5½ | 7½ |
| 1100 | 3 | 39 | 4 | 07 | 3.83 | 6 | 8½ |
| 1200 | 4 | 01 | 4 | 32 | 4.20 | 6½ | 9 |
| 1300 | 4 | 24 | 4 | 58 | 4.58 | 7½ | 9½ |
| 1400 | 4 | 47 | 5 | 25 | 4.96 | 7½ | 10½ |
| 1500 | 5 | 11 | 5 | 52 | 5.35 | 8½ | 11½ |
| 1600 | 5 | 35 | 6 | 20 | 5.74 | 9 | 12½ |
| 1700 | 5 | 59 | 6 | 49 | 6.14 | 9½ | 13½ |
| 1800 | 6 | 24 | 7 | 17 | 6.54 | 10½ | 14 |
| 1900 | 6 | 50 | 7 | 47 | 6.95 | 10½ | 15 |
| 2000 | 7 | 16 | 8 | 18 | 7.36 | 11½ | 15½ |
| 2100 | 7 | 43 | 8 | 50 | 7.77 | 12½ | 16½ |
| 2200 | 8 | 11 | 9 | 23 | 8.18 | 12½ | 17½ |
| 2300 | 8 | 39 | 9 | 57 | 8.60 | 13½ | 18½ |
| 2400 | 9 | 07 | 10 | 33 | 9.02 | 14 | 19½ |
| 2500 | 9 | 36 | 11 | 10 | 9.44 | 14½ | 20½ |
| 2600 | 10 | 06 | 11 | 48 | 9.87 | 15½ | 21½ |
| 2700 | 10 | 36 | 12 | 28 | 10.31 | 16 | 22½ |
| 2800 | 11 | 07 | 13 | 09 | 10.75 | 16½ | 23½ |
| 2900 | 11 | 38 | 13 | 51 | 11.20 | 17½ | 24½ |
| 3000 | 12 | 10 | 14 | 34 | 11.65 | 18 | 25½ |
| 3100 | 12 | 43 | 15 | 18 | 12.11 | — | 26½ |
| 3200 | 13 | 16 | 16 | 03 | 12.58 | — | 27½ |
| 3300 | 13 | 49 | 16 | 49 | 13.05 | — | 28½ |
| 3400 | 14 | 23 | 17 | 36 | 13.52 | — | 29½ |
| 3500 | 14 | 57 | 18 | 24 | 14.00 | — | 30½ |
| 3600 | 15 | 32 | 19 | 13 | 14.48 | — | 31½ |
| 3700 | 16 | 07 | 20 | 04 | 14.97 | — | 32½ |
| 3800 | 16 | 43 | 20 | 56 | 15.46 | — | 33½ |
| 3900 | 17 | 20 | 21 | 49 | 15.95 | — | 34½ |
| 4000 | 17 | 57 | 22 | 43 | 16.45 | — | 35½ |

40185
9547

57
16
2965

RANGE TABLE for 2.95-inch Q.F. Gun, Mark I.

Based on Practice of 11.1.01.

Published October, 1901. 40185
9500

| | | | |
|-------------|---|--|---|
| Charge, | { | weight, 5½ oz. | Muzzle velocity, 740 f.s. |
| | | gravimetric density, $\frac{95.08}{0.292}$ | |
| | { | nature, ballistite. | Nature of mounting, travelling mountain, Mark I. |
| Projectile, | { | nature, double shell. | Jump, + 22 minutes. |
| | | weight, 18 lb. 5 oz. | |

| Remaining velocity (actual). | 5 minutes' elevation or deflection alters point of impact. | | To strike an object 10 feet high, range must be known within | Angle of descent. | ELEVATION. | 50 per cent. of rounds should fall in. | | | | Time of flight. |
|---------------------------------|--|--------------------------|--|-------------------|------------|--|---------|----------|---------|-----------------|
| | Range. | Vertically or laterally. | | | | Range. | Length. | Breadth. | Height. | |
| f.s. | yards. | yards. | yards. | ° / | ° / | yards. | yards. | yards. | yards. | secs. |
| 731 | 16 | 0.14 | 163 | 0 34 | 0 9 | 100 | ... | ... | ... | 0.42 |
| 723 | 15 | 0.29 | 84 | 1 8 | 0 41 | 200 | ... | ... | ... | 0.84 |
| 714 | 15 | 0.43 | 55 | 1 43 | 1 13 | 300 | ... | ... | ... | 1.26 |
| 706 | 15 | 0.58 | 41 | 2 18 | 1 45 | 400 | ... | ... | ... | 1.69 |
| 698 | 15 | 0.72 | 33 | 2 54 | 2 18 | 500 | ... | ... | ... | 2.12 |
| 690 | 14 | 0.87 | 27 | 3 30 | 2 51 | 600 | 3.0 | 0.65 | 0.2 | 2.55 |
| 682 | 14 | 1.01 | 23 | 4 7 | 3 24 | 700 | 4.1 | 0.71 | 0.4 | 2.99 |
| 675 | 14 | 1.16 | 20 | 4 45 | 3 58 | 800 | 5.2 | 0.78 | 0.6 | 3.44 |
| 668 | 14 | 1.31 | 18 | 5 23 | 4 33 | 900 | 6.3 | 0.85 | 0.8 | 3.90 |
| 661 | 14 | 1.45 | 16 | 6 2 | 5 8 | 1000 | 7.5 | 0.92 | 1.0 | 4.36 |
| 654 | 14 | 1.60 | 14 | 6 42 | 5 44 | 1100 | 8.6 | 1.00 | 1.2 | 4.83 |
| 648 | 14 | 1.74 | 13 | 7 22 | 6 20 | 1200 | 9.8 | 1.09 | 1.5 | 5.30 |
| 642 | 13 | 1.89 | 12 | 8 4 | 6 57 | 1300 | 11.0 | 1.19 | 1.8 | 5.78 |
| 637 | 13 | 2.03 | 11 | 8 46 | 7 34 | 1400 | 12.2 | 1.30 | 2.1 | 6.26 |
| 632 | 13 | 2.18 | 10 | 9 30 | 8 12 | 1500 | 13.4 | 1.43 | 2.5 | 6.75 |
| 628 | 13 | 2.32 | 9 | 10 14 | 8 50 | 1600 | 14.7 | 1.56 | 2.9 | 7.25 |
| 624 | 13 | 2.47 | 8 | 11 0 | 9 29 | 1700 | 16.0 | 1.71 | 3.3 | 7.76 |
| 621 | 12 | 2.61 | 8 | 11 46 | 10 9 | 1800 | 17.3 | 1.86 | 3.7 | 8.29 |
| 618 | 12 | 2.76 | 7 | 12 34 | 10 49 | 1900 | 18.6 | 2.03 | 4.2 | 8.83 |
| 615 | 12 | 2.91 | 7 | 13 23 | 11 30 | 2000 | 20.0 | 2.21 | 4.7 | 9.38 |
| 612 | 12 | 3.05 | 7 | 14 14 | 12 12 | 2100 | 21.4 | 2.40 | 5.3 | 9.94 |
| 609 | 12 | 3.20 | 6 | 15 6 | 12 54 | 2200 | 22.8 | 2.60 | 6.0 | 10.52 |
| 606 | 12 | 3.34 | 6 | 15 58 | 13 37 | 2300 | 24.2 | 2.81 | 6.7 | 11.11 |
| 604 | 11 | 3.49 | 5 | 16 51 | 14 21 | 2400 | 25.7 | 3.02 | 7.5 | 11.71 |
| 602 | 11 | 3.63 | 5 | 17 44 | 15 6 | 2500 | 27.1 | 3.24 | 8.4 | 12.32 |
| 600 | 11 | 3.78 | 5 | 18 38 | 15 50 | 2600 | 28.6 | 3.47 | 9.4 | 12.95 |
| 598 | 11 | 3.92 | 5 | 19 32 | 16 36 | 2700 | 30.0 | 3.71 | 10.5 | 13.59 |
| 597 | 11 | 4.07 | 4 | 20 27 | 17 22 | 2800 | 31.5 | 3.95 | 11.7 | 14.24 |
| 595 | 10 | 4.21 | 4 | 21 22 | 18 9 | 2900 | 33.0 | 4.21 | 13.0 | 14.90 |
| 594 | 10 | 4.36 | 4 | 22 18 | 18 56 | 3000 | 34.5 | 4.48 | 14.4 | 15.58 |
| 593 | 10 | 4.51 | 4 | 23 14 | 19 44 | 3100 | 36.0 | 4.75 | 15.9 | 16.27 |
| 592 | 10 | 4.65 | 4 | 24 11 | 20 32 | 3200 | 37.5 | 5.03 | 17.5 | 16.97 |
| 591 | 10 | 4.80 | 4 | 25 8 | 21 21 | 3300 | 39.0 | 5.32 | 19.1 | 17.68 |
| 590 | 10 | 4.94 | 3 | 26 5 | 22 10 | 3400 | 40.6 | 5.61 | 20.8 | 18.41 |
| 589 | 10 | 5.09 | 3 | 27 3 | 23 0 | 3500 | 42.2 | 5.92 | 22.5 | 19.15 |
| 588 | 9 | 5.23 | 3 | 21 1 | 23 50 | 3600 | 43.8 | 6.24 | 24.2 | 19.90 |
| 587 | 9 | 5.38 | 3 | 29 0 | 24 41 | 3700 | 45.4 | 6.56 | 26.0 | 20.66 |
| 586 | 9 | 5.52 | 3 | 30 0 | 25 32 | 3800 | 47.0 | 6.89 | 27.8 | 21.44 |
| 585 | 9 | 5.67 | 3 | 31 1 | 26 24 | 3900 | 48.6 | 7.22 | 29.6 | 22.23 |
| 584 | 9 | 5.81 | 3 | 32 1 | 27 16 | 4000 | 50.2 | 7.56 | 31.4 | 23.03 |

MEKOMETERS.

For information concerning Mekometers, *see* the "Mekometer Handbook" and "Regulations for Care and Preservation of War Matériel and for Magazines"; also "Equipment Regulations, Part I."

Drill for Q.F. 2.95-inch Jointed Mountain Gun.

SPECIAL IMPLEMENTS OR "SIDE ARMS" FOR LIMBERING, UNLIMBERING, AND SERVING THE Q.F. 2.95-INCH MOUNTAIN GUN IN ACTION.

Gun mule.

| | | |
|----------------------------|----|---|
| 1 bearer, muzzle .. | .. | A double staved bearer, with two gun-metal hinged jaws in the centre. For lifting at the muzzle of the gun. Carried on cradle "off" side. |
| 1 lifter, gun or cradle .. | .. | A tubular steel bar, cranked in the centre. For lifting at the breech of the gun. Carried on cradle, "rear" side. |

Cradle mule.

| | | |
|-----------------------------|----|---|
| 2 lifters, gun or cradle .. | .. | As above. For lifting the cradle. Carried one on each side. |
| 1 tampeon, cradle, front .. | .. | } A disc and ring of tinned steel, the exterior of the ring being covered with white serge. |
| 1 tampeon, cradle, rear .. | .. | |
| 1 cleaner, cradle .. | .. | Carried one in each end of the cradle, secured by connecting straps. |
| 1 brush, bore.. .. | .. | Two felt pads, riveted between two steel discs, with a D shape steel handle. Carried inside the cradle. |
| | .. | A piassaba brush with stave (will be superseded by the "cleaner, piassaba"). Carried on cradle, "off" side. |

| | |
|---------------------------|--|
| 2 caps, piston rod | Leather caps for protection of the screwed portion of the piston rod when detached from the gun. |
| 1 cap, foresight | A leather cap for protection of the foresight when travelling. |
| 1 cleaner, piassaba | To supersede "brush, bore" when unserviceable. Carried inside cradle. |

Carriage mule.

| | |
|----------------------------|--|
| 1 handspike, traversing .. | } Carried inside the trail, strapped up with the carriage. |
| 2 check ropes | |

Section Gun Drill.

THE DETACHMENT

Consists of nine men, who fall in two deep, one pace between ranks, 1 on right of front rank.

TO TELL OFF.

| | |
|---------------------------|---------------|
| <i>Section Commander.</i> | <i>No. 1.</i> |
| Section—Tell Off. | |

At the order from the Section Commander.—1 numbers himself 1, right hand man of rear rank 2, his front rank man 3, and so on to the left.

DETACHMENT REAR.

Formed as above, 3 yards in rear of gun, 1 covering the off wheel.

TO FORM "DETACHMENT REAR" IN ACTION.

| | |
|-------------------------------|----------------------|
| <i>Section Commander.</i> | <i>No. 1</i> |
| Section—Detachment Rear. | No.... Double March. |

At the order from 1, the remainder double to their places on the left of 1, each number halting as he reaches his place.

FROM "DETACHMENT REAR" TO TAKE POST FOR ACTION.

| | |
|------------------------------------|----------------------|
| <i>Section Commander.</i> | <i>No. 1.</i> |
| Section—Take Post for Action. | No.... Double March. |

At the order from 1 all the men double to their places and act as detailed on p. 29.

TO MOVE THE GUN WITH DRAG ROPES.

Section Commander.

No. 1.

.... Section—With Drag Ropes,
Prepare to Advance.

- 1 mans the handspike in the trail.
- 2 and 4 hook the drag ropes to washers, and with 5 and 6 on their own sides man drag ropes.
- 3 and 7 move side arms, &c.
- 8 and 9 move ammunition carriers.

TO MOVE THE GUN WITHOUT DRAG ROPES.

Section Commander.

No. 1.

.... Section—Without Drag Ropes,
Prepare to Advance.

- 1 mans the handspike in the trail.
- 2 and 4 man the wheels.
- 3 and 7 move side arms, &c.
- 5, 6, 8 and 9 move ammunition carriers.

GUN UNLIMBERED.

The position of the Gun Detachment for Limbering up is as follows :—

- 1 on right of, and close to, breech.
- 2 in rear of right wheel.
- 3 in rear of left wheel.
- 4 in front of right wheel.
- 5 in front of left wheel.
- 6 two yards in rear of 1.
- 7 two yards in rear of 3.

When the order "Cease Firing" is preceded by "Prepare to Limber up," the numbers will assume these positions directly the duties to be carried out on ceasing fire have been completed. The order "Cease Firing" should not be given till the mules are near enough to admit of the guns being limbered up at once.

The reserve numbers rejoin their sub-sections as the mules come up, and 8 and 9 go to the ammunition carriers and load up the ammunition mules.

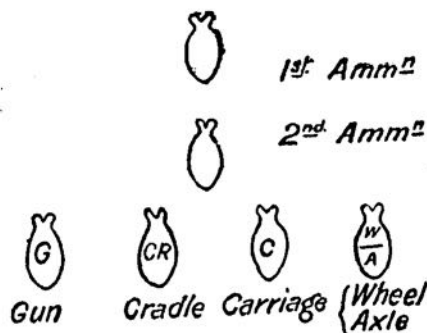
When mules are not on parade, "Cease Firing" is not preceded by the order "Prepare to Limber up," and the numbers then remain in their positions in action after carrying out the necessary duties on ceasing fire. They may be ordered to rise in those positions.

POSITION OF STORES AT "CEASE FIRING."

- 1 front lifter on ground outside left wheel.
- 2 rear lifters on ground outside right wheel.
- Muzzle bearer on ground outside left wheel.
- Drag ropes on ground, one outside each wheel.
- Handspike, point to front, outside left lifter and bearer.
- Breech and muzzle covers and cradle tampeons outside right lifters.
- Tangent sight in pocket on cradle.
- Fore sight cap on fore sight in gun.
- Lanyard round 3's neck, piston rod caps in his pocket.
- Check ropes passed in and out of spokes on the wheels, and hooked.

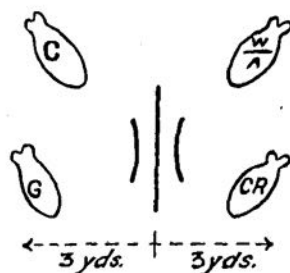
POSITION OF MULES AT "CEASE FIRING."

10 yards in rear of the gun. 1 yard interval and distance between mules.



"FRONT LAMBER UP."

Position of Mules.



"FIRST LIFT—PREPARE TO LIFT."

- 1 picks up rear gun lifter and ships it in the loop.
- 2 opens spring catches and turns buffer handles.
- 3 picks up muzzle bearer and stands ready to pass it under the muzzle to 2.
- 4 and 5 steady the wheels till the gun is withdrawn.

"LIFT."

1 withdraws gun from cradle till rear collar rests on bridge in rear of cradle.

2 passes left arm over and round chase.

3 passes muzzle bearer under muzzle to 2, who adjusts it in rear of front collar and removes arm from chase.

1, 2 and 3 lift gun to G saddle.

8 withdraws and lashes lifter and bearer, straps up gun, and fixes breech and muzzle covers.

G reverses and moves to position 6 yards in rear of the trail.

WHEN GUN IS CLEAR OF THE CRADLE:—

7 steps up, depresses cradle to extreme limit, and lifts at bridge on rear of cradle.

4 turns up axis handle.

5 passes front cradle lifter through front loop to 4.

6 withdraws elevating joint pin, picks up rear cradle lifter, and holds it in his right hand ready to pass it through rear loop to 7.

4, 5 and 7 lift cradle clear of carriage, and then 6 passes rear cradle lifter through rear loop to 7, and these four numbers lift cradle to CR saddle.

9 withdraws and lashes lifters, straps up cradle, and fixes cradle tampons.

CR moves off to a position 1 yard in front of G.

"SECOND LIFT—PREPARE TO LIFT."

1 to front of carriage, facing rear.

2 and 3 remove and pocket linch pins and washers, and stand facing the wheels on their own sides.

5 picks up handspike in left hand, steps in on the left of the trail facing the front, and passes his inner hand down inside and under the bracket of the carriage.

6 steps in on right of trail facing the front, replaces elevating joint pin, passes inner hand down inside and under the bracket of the carriage and seizes axle lever.

7 to point of trail facing the front.

"LIFT."

5 and 6 lift slightly to allow the wheels to be removed, 1 helping if necessary by lifting at handles on breast of carriage.

2 and 3 remove the wheels, replace linch pins and washers, and lift wheels to $\frac{W}{A}$ saddle.

As soon as 6 turns up axle lever, 1 withdraws axle and with 4 places it on $\frac{W}{A}$ saddle. 4 straps up axle, and $\frac{W}{A}$ moves off to a position 1 yard in front of C. 1 replaces piston rod caps.

6 turns up axle lever, and 5 passes handspike through handles to 6, and with 6 and 7 lifts carriage to C saddle.

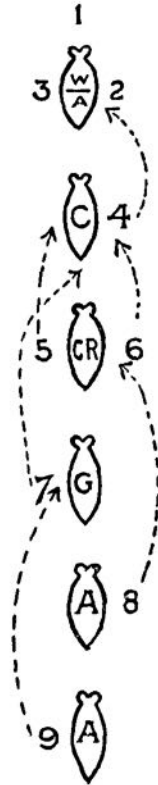
5 withdraws handspike and places it outside the left bracket, point to front.

7 and 6 strap up.

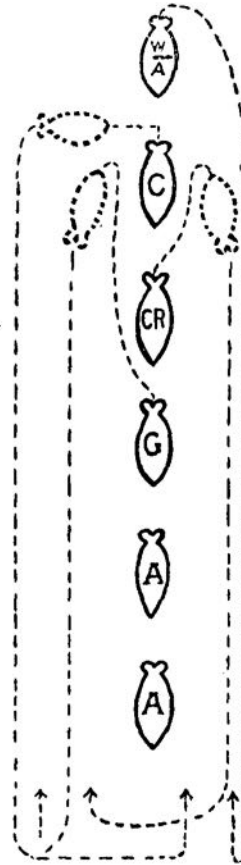
1 gives the order "Cover Off," and takes his place 1 yard in front of $\frac{W}{A}$.

The detachment form the order of march and cover from the front. Ammunition mules close up till the first ammunition mule is 1 yard in rear of G.

ORDER OF MARCH.



Dotted lines show the positions which numbers assume on "Prepare for Action."

"ACTION FRONT"
(position and movement of mules).

"PREPARE FOR ACTION."†

This command is given at the halt in the preparatory position.

1 superintends the preparation for action, removes and pockets

† N.B.—Before coming into action the Section Commander will satisfy himself that the protrusion of his strikers is correct, as follows:—Swing the breech screw and carrier into the loading position, then release the catch retaining breech screw and turn the screw to the locked position. Release the trigger sear to allow the striker to go forward and place the gauge, striker, protrusion, No. 2, over the point of the firing pin.

He will also remove the trigger sear from the gun and examine it to see that the spring is not permanently compressed or broken. The distance between the free ends of the spring when compressed is 0.55 inch. The spring should be tested by having the free ends pressed together and released several times, after which it should be measured between the free ends to see that it has not become compressed.

Before replacing the trigger sear in the gun, care must be taken to thoroughly cleanse the seating for its reception in the carrier and to lubricate the working surfaces.

piston rod caps, and resumes position in order of march, when all is ready. He must see that the buffer is full before leaving the gun park.

2 and 3 unstrap wheels.

4 unstraps axle.

5 and 6 to C, unstrap carriage; 5 takes handspike and carries it in his hand.

7 to rear of C.

8 to CR, removes cradle tampons and carries them in his hand.

9 to G, removes gun covers and carries them in his hand.

Detachment take their places as shown in the diagram.

"ACTION FRONT."

"FIRST LIFT—PREPARE TO LIFT."

1 goes to near front side of $\frac{W}{A}$.

2 and 3 remove and pocket linchpins and washers, and seize wheels.

4 goes to near rear side of $\frac{W}{A}$ ready to assist 1 to lift off axle.

5 passes handspike through breast handles of carriage to 6, who seizes it.

7 seizes trail handle.

8 goes to CR, unfastens and places lifters, unstraps cradle, and then places cradle tampons on ground on right of carriage.

9 goes to G, unfastens and places lifter and bearer, unstraps gun, and then places breech and muzzle covers on ground on left of carriage.

"LIFT."

2 and 3 lift off wheels and place them on the ground in front of $\frac{W}{A}$.

1 and 4 lift off axle, which 1 holds ready to place in transom of carriage, standing back to front between the wheels. $\frac{W}{A}$ reverses to the right and moves off under cover. 4 takes off dragropes and places them on ground outside the wheels. C advances and takes ground to the left in rear of the wheels, and halts.

5, 6, and 7 lift off carriage; 5 and 6 pass their inner hands down inside and under the brackets on their own sides, and 5 withdraws handspike. These numbers then place the carriage in position, and 1 drops axle into transom and turns down axle lever. 6 removes elevating joint pin.

2 and 3 then place on the wheels and replace linch pins and washers. C takes ground to the left and moves off to his place on left of $\frac{W}{A}$.

"SECOND LIFT—PREPARE TO LIFT."

CR moves up in rear of the carriage, reverses to the right and halts.

G moves up in rear of CR, reverses to the left and halts.

4, 5, 6, and 7 double to CR; 4 and 5 seize front lifter, and 6 and 7 rear lifter.

1, 2 and 3 double to G; 2 and 3 seize muzzle bearer, and 1 seizes rear gun lifter.

LIFT."

4, 5, 6 and 7 lift off cradle; 6 withdraws rear lifter as soon as 7 has shifted his hands to the bridge of cradle and taken the weight; 4, 5 and 7 then drop cradle at extreme depression into front transom of carriage, and 6 places lifter on ground outside right wheel.

6 adjusts elevating wheel, if necessary, and replaces elevating joint pin.

7 sees that the buffer handles are turned up.

5 withdraws front lifter and lays it down outside left wheel.

4 turns down axis handle, and he and 5 steady the wheels till the gun is home.

1, 2 and 3 lift off gun and carry it to cradle; 2 passes left arm over and round the chase, and inserts muzzle in cradle as far as rear collar.

1 withdraws rear gun lifter, and guides gun into cradle.

2 turns down buffer handles, and closes spring catches when gun is home.

3 withdraws muzzle bearer, and lays it down outside left wheel, and 1 lays rear lifter down on ground outside right wheel.

8 and 9 lift ammunition carriers off ammunition mules.

5 brings up a carrier and places it outside the left wheel.

THE DETACHMENT TAKES POST FOR ACTION AS FOLLOWS:—

1 kneels on left knee at end of handspike, commands and superintends entire service of the gun, lays for direction. He only gives the words of command shown for him, and does not repeat the section commander's orders; his executive orders should not be louder than is necessary for his sub-section to hear.

2 kneels on left knee on right of breech and facing it, attends to breech, fixes right check rope and tightens it from the front. He plants aiming posts, shifts them if required, and brings them in on the order "In Aiming Posts."

3 kneels on right knee on left of handspike, lays and fires. He removes and pockets cap of foresight, supplies himself with tangent scale from pocket on cradle, attaches lanyard to trigger and leaves it on the trail. When his gun is ready he holds up his left hand as a signal that his gun is ready, seizes lanyard with his right hand, and awaits the order from his No. 1.

4 kneels on right knee on left of breech, fixes left check rope and tightens it from the front. He sets fuzes during ranging and when firing at a moving target, and resets them when a change of fuze has been ordered until fresh carriers have been supplied, shows fuzes to 1 during battery fire, removes safety pin or pins, and loads.

5 supplies 4 with full carriers of ammunition, and sets fuzes after ranging is completed, before bringing ammunition up to the gun.

6, 7, 8 and 9 are reserve numbers, and lie down in rear of gun or on flank of battery, as ordered, when cover is not close at hand.

TO LOAD.

| <i>Section Commander.</i> | <i>No. 1.</i> |
|--|--|
| Section—Percussion Shrapnel [or Double Shell, or Fuze....]. Load. | No.... Percussion Shrapnel [or Double Shell, or Fuze....]. Load. |

4 sets time fuze, shows it to **1**, removes safety pin or pins, loads and kneels clear.

2 closes breech and kneels clear.

3 lays (or checks his lay), gives the signal (as above), and kneels ready to fire.

TO FIRE.

| | | |
|---------------------------|--|---------------|
| <i>Section Commander.</i> | | <i>No. 1.</i> |
| Fire No..... Gun. | | Fire. |

At the order from the Section Commander, 1 kneels clear of recoil, sees that 2, 3 and 4 are also clear, and gives order to fire.

3 fires the gun by pulling the lanyard smartly towards him.

MISSFIRES.

In the event of a missfire, **3** will, after a pause of ten seconds, detach lanyard, double it round cocking handle, cock the striker by pulling the lanyard, attach it again to trigger, resume firing position, and again wait for order to fire. In the event of a second missfire, he will wait *one minute* before ordering **2** to open breech gently and examine cartridge and striker.

DIRECTLY THE GUN STOPS IN ITS RECOIL

2 opens breech.

The gun is run up to its marks without any order,

1 manning handspike, **2** and **3** wheels.

2 and **4** release and refix check ropes, and tighten them from front.

PREPARE TO LIMBER UP.

Mules, if under cover, come up to "Cease Firing" position (see page 25), ammunition mules (as required) up to position of carriers.

8 and **9** load up ammunition mules with such carriers as are not likely to be required [and drag ropes if they have been in use].*

TO CEASE FIRING.

1 unships handspike and lays it down outside left lifter and bearer, point to front, **3** places lanyard round neck, tangent sight in pocket on cradle, and cap on foresight.

2 closes breech and releases trigger.

2 and **4** release check ropes and hook them up on wheels.

8 and **9** complete loading up of ammunition.

Note.—If "Prepare to Limber Up" has been given, numbers take post as detailed on page 24. Otherwise they remain in positions until "Rise" is given. The latter would always be done at standing gun drill.

* If carried on 1st ammunition as suggested.

METHOD OF DRILLING RECRUITS.

GENERAL REMARKS.

Many good recruits are acquainted only with the commonest English words, and as their duties and the material they have to use are altogether new and strange, instructors should be careful—

To use the simplest language possible.

To explain, as they occur, all technical terms.

To illustrate descriptions by means of a piece of chalk, or otherwise, and in all cases to render clear the object of the various duties.

Not to attempt to teach recruits elaborate descriptions, exact measurements, &c., which they do not understand.

To avoid needless repetitions, or wearying the men by keeping them for a long time at one thing, the drill should be varied by short descriptions (avoiding manufacturing details), setting fuzes, &c.

To bring men forward by successive steps, by explaining a position and then doing it; for instance, when commencing recruits' gun drill, the instructor should himself show how a duty should be performed, and then cause every man in turn to do that duty (make every man do 1's duty, then every man 2's, then 4's, and so on). When each man knows the duties of each post separately, the numbers who work and move together should be instructed after the manner described below, before commencing gun drill in quick time.

Great patience is necessary on the part of the instructor. He must make allowance for the different capacities of the recruits, and squads should periodically be arranged so that the intelligent soldier may reap the advantage of his work, and not be kept back by those of inferior ability. Recruits as they progress should be called out in turn to drill, for this gives a man confidence, helps him to learn, and causes him to take an additional interest in his work.

The instructor should place himself where he can be seen and heard by all in the squad; should stand in a smart soldierlike attitude, and should avoid pacing up and down, looking down on the ground, turning his back on the squad, and similar habits, which have the effect of fidgeting the men, and distracting their attention.

His explanation should be given in a distinct voice; his word of command should be sharp and decisive.

Stress is laid on the above points, because men unconsciously imitate their instructors. A first-rate instructor will make a good detachment; his manner and style are therefore of the first importance.

The utmost alertness of attitude and smartness of movement should be enforced throughout gun drill, but to attempt quickness without precision is bad drill, and is very destructive to material and unsteady to pack animals.

The instructor can at any time ascertain that each number is at his post, by proving. This he does by calling out "*Prove your numbers—1, 2, &c.*" The man called upon raises his right hand, and extends it smartly to the front, hand open, thumb uppermost, hand as high as the shoulder. When the next number is called, he drops his hand. The last number lowers his hand at the word "*Down.*"

If the instructor at any time wishes to change the numbers, he gives the order, "Change Rounds." On this 1 becomes 9; 9, 8; 8, 7; 7, 6; 6, 5; 5, 4; 4, 3; 3, 2; 2, 1.

The following is only an example of how the drill should be taught; the details of the other operations should be divided up in a similar manner:—

TO LOAD.

At the order from the section commander—

" . . . Section—Percussion load "—

1 gives the number of his gun and "percussion load."

" . . . Section—Percussion load."

Next explain that—

At the order from 1

4 places the round in the bore, and 2 closes the breech.

4 and 2 "Go on," &c., &c.

MULE EQUIPMENT.

The following should be remembered in reading the Details of Packing:—

Ordnance Mules.—All mules belonging to the combatant establishment of a battery are classed as ordnance mules and led by a separate driver.

Relief Mules.—All the mules of a gun team, and certain others, have relief or duplicate mules carrying identical saddlery and cradles—this enables loads to be changed on the march, and prevents the total disablement of a gun in action if any mule carrying a portion of it is shot.

Barebacked Mules.—Spare mules without harness.

Baggage Mules are transport mules, and have the status of army transport; their attendants are non-combatants, one to three mules. They form a permanent addendum to mountain batteries in India, but have never been provided for any battery on the Imperial establishment.

DETAIL OF PACKING.

MULE TRANSPORT.

| Mule. | Articles carried. | Weight. | Remarks. |
|-----------------|---|---------|---------------------------|
| GUN MULE. | SADDLERY. | | lb. oz. |
| | 1 set M.B. harness (as per list, p. 44) | 39 0 | |
| | 1 cradle | 32 0 | |
| | 1 head rope | 0 11 | |
| | 1 heel rope | 1 2 | |
| | LOAD. | | |
| | 1 gun | 236 0 | On top of cradle. |
| | 2 straps, gun, Q.F. 2'95-in. and R.M.L. 2'5 in. (1½ in. x 35 in.) ... | 1 1½ | |
| | 1 bearer, muzzle | 7 0 | On cradle, off side. |
| | 1 lifter, gun and cradle | 5 8 | On cradle, near side. |
| | 2 straps, securing, ¾ in. x 13 in. | 0 2 | |
| | 1 breech cover | 1 10½ | On gun. |
| | 1 muzzle cover | 0 6½ | On gun. |
| | 2 lashings, 1 in. x 10 ft. | 0 14½ | |
| | 1 cover, 6½ ft. x 6½ ft. (with 2 lashings, 1 in. x 21 ft.) | 12 8 | |
| | Total weight | 338 0 | |
| CRADLE MULE. | SADDLERY. | | lb. oz. |
| | 1 set M.B. harness (as per list, p. 44) | 39 0 | |
| | 1 cradle | 34 8 | |
| | 1 head rope | 0 11 | |
| | 1 heel rope | 1 2 | |
| | LOAD. | | |
| | 1 carriage recoil cradle | 194 8 | On top of cradle. |
| | 2 straps, carriage or recoil cradle, Q.F. 2'95 inch (1½ in. x 54 in.) ... | 1 7½ | |
| | 2 lifters, gun and cradle | 11 0 | 1 on each side of cradle. |
| | 1 brush bore † | 6 0 | On cradle, off side. |
| | 1 cap, sponge, No. 6 | 0 4 | |
| | 3 straps, securing, ¾ in. x 13 in. | 0 3 | |
| | 1 spring for buffer (spare) | 3 4½ | On cradle, near side. |
| | 2 straps, securing, ¾ in. x 18 in. | 0 3½ | |
| | 1 cleaner, cradle | 1 11½ | Inside cradle. |
| | 1 } tampeon, protecting cradle { front | 2 7½ | In cradle. |
| | 1 } with connecting strap { rear | | |
| | 2 caps, piston rod | 0 3 | On piston rod. |
| | 1 cap, foresight | 0 1 | On foresight. |
| | 2 lashings, 1 in. x 10 ft. | 0 14½ | |
| | 1 cover, 6½ ft. x 6½ ft. | 12 8 | |
| | Total weight | 310 1 | |

† On becoming unserviceable will be superseded by "Cleaner, piashaba."
(9343)

c

Detail of Packing—*continued.*

| Mule. | Articles carried. | Weight. | Remarks. |
|----------------------------|--|-----------------|------------------------------|
| WHEEL AND AXLE MULE. | SADDLERY. | | |
| | 1 set M.B. harness (as per list, p. 44) | lb. oz. 39 0 | |
| | 1 cradle | 40 0 | |
| | 1 head rope | 0 11 | |
| | 1 heel rope | 1 2 | |
| | LOAD. | | |
| | 2 wheels | 142 0 | 1 on each side. |
| | 2 straps, wheels (1½ in. × 82 in.) | 2 2 | |
| | 1 axletree | 48 0 | On top of cradle. |
| | 2 straps, axletree (1½ in. × 35 in.) | 1 1½ | |
| | 1 pocket, drag washer | 0 8 | |
| | 1 washer, drag } in pocket { (spare) | 0 14 | |
| | 1 pin, linch } " " " | 0 6 | |
| | 1 grease box | 0 8½ | |
| | 2 straps, securing, 1 in. × 22 in. | 0 4½ | |
| | 1 pair ropes, drag, light, 14 ft. 6. in. | 17 0 | |
| | 2 lashings, 1 in. × 10 ft. | 0 14½ | |
| | 1 cover, 6½ ft. × 6½ ft. | 12 8 | |
| | Total weight | 307 0 | |
| CARRIAGE MULE. | SADDLERY. | | |
| | 1 set M.B. harness (as per list, p. 44) | lb. oz. 39 0 | |
| | 1 cradle | 31 0 | |
| | 1 head rope | 0 11 | |
| | 1 heel rope | 1 2 | |
| | LOAD. | | |
| | 1 carriage body, with elevating gear | 234 12 | On top of cradle. |
| | 2 straps, carriage or recoil cradle, Q.F. 2-95-inch (1½ in. × 54 in.) | 1 7½ | |
| | 1 handspike, traversing | 6 0 | } Strapped in with carriage. |
| | 2 check ropes | 7 0 | |
| | 1 case, leather, spare } (For contents see p. 47.) | 5 14 | On cradle, near side. |
| | 1 case, leather, tools } parts | 9 2 | On cradle, off side. |
| | 2 lashings, 1 in. × 10 ft. | 0 14½ | |
| | 1 cover, 6½ ft. × 6½ ft. | 12 8 | |
| | Total weight | 349 7 | |

Detail of Packing—*continued.*

| Mule. | Articles Carried. |
|--|--|
| AMMUNITION MULE. (Shrapnel shell or case shot.) | <p>SADDLERY.</p> <p>1 set M.B. harness (<i>vide</i> list, p. 44). 1 pair of pannels, with cradle and securing straps. 1 numnah. 1 head rope. 1 heel rope.</p> <p>LOAD.</p> <p>2 hangers, ammunition carriers. 4 ammunition carriers, each containing 3 rounds.</p> <p><i>Total weight</i> { <i>with shrapnel shell</i>, 285 lb. 14½ oz. { <i>with case shot</i>, 314 lb.</p> |
| AMMUNITION MULE. (Double shell.) | <p>SADDLERY.</p> <p>1 set M.B. harness (<i>vide</i> list, p. 44). 1 pair of pannels, with cradle and securing straps. 1 numnah. 1 head rope. 1 heel rope.</p> <p>LOAD.</p> <p>2 boxes, pack transport, No. 2, double shell, each containing 4 rounds.</p> <p><i>Total weight (about)</i> 283 lb. 14½ oz.</p> |
| PIONEER MULE. | <p>SADDLERY.</p> <p>1 set M.B. harness, except surcingle (<i>vide</i> list, p. 44). 1 ammunition cradle. 1 pair pannels.</p> |

Detail of Packing—*continued.*

| Mule. | Articles Carried. |
|------------------------------------|---|
| Pioneer Mule— <i>continued.</i> | <p style="text-align: center;">LOAD.</p> <p>4 spades, N.P. 1 pair racks, leather, intrenching tools. 2 felling axes, with helves. 1 miner's pinching bar, 3 feet 6 inches. 2 hammers, uphand, 7 lbs. 4 billhooks. 4 pickaxes, with helves. 3 lengths cordage, 1-inch (8 feet each). 4 small reaping hooks. 4 hand hatchets. 4 helves, spare, of sorts. 12 banderols. 2 straps, cloak, and line gear. 1 cover, 6½ ft. × 6½ ft.</p> <p style="text-align: right;"><i>Total weight 236 lb. 13½ oz.</i></p> |
| FORGE MULE. | <p style="text-align: center;">SADDLERY.</p> <p>1 set M.B. harness, baggage, mule (<i>vide</i> list, p. 45). 1 strap, tool box. 1 „ cloak and line gear. 1 packsaddle, G.S., small, with girth straps and pannels.</p> <p style="text-align: center;">LOAD.</p> <p>1 anvil, 56 lbs. 1 „ block. 1 box for tools. 1 forge, packsaddle. 1 hammer, packsaddle, forge, handled, uphand. 1 slice. 1 poker. 1 cover, 6 ft. × 6 ft. 1 cord, forage.</p> <p style="text-align: right;"><i>Total weight 280¼ lb.</i></p> <p>The line gear, &c., of this mule is carried on a spare baggage mule.</p> |

Detail of Packing—*continued.*

| Mule. | Articles Carried. |
|--------------------------|--|
| No. 1 ARTIFICER MULE. | <p data-bbox="824 485 980 512">SADDLERY.</p> <p data-bbox="618 537 1024 642">1 set M.B. harness (<i>vide</i> list, p. 44). 2 straps, cloak and line gear. 1 pair pannels. 1 ammunition cradle.</p> <p data-bbox="862 690 943 718">LOAD.</p> <p data-bbox="618 743 1049 999">2 artificer boxes, Clarkson's— Containing— Tools, smiths'. „ farrier and shoeing smiths'. 2 tool holdalls, artificers'. 2 sets extra tools for holdalls. 1 set line gear. 1 nose bag. 1 cover, 6 ft. × 6 ft. 1 great coat.</p> <p data-bbox="862 1024 1089 1052"><i>Total weight 325$\frac{3}{4}$ lb.</i></p> |
| No. 2 ARTIFICER MULE. | <p data-bbox="824 1129 980 1157">SADDLERY.</p> <p data-bbox="618 1182 919 1209">As for No. 1 artificer mule.</p> <p data-bbox="862 1257 943 1285">LOAD.</p> <p data-bbox="618 1310 1000 1545">2 artificer boxes, Clarkson's— Containing— Tools, saddlers'. 2 tool holdalls, artificers'. 2 sets extra tools for holdalls. 1 set line gear. 1 nose bag. 1 canvas cover, 6 ft. × 6 ft. 1 great coat.</p> <p data-bbox="862 1570 1081 1598"><i>Total weight 219$\frac{3}{4}$ lb.</i></p> |
| No. 3 ARTIFICER MULE. | <p data-bbox="824 1650 980 1677">SADDLERY.</p> <p data-bbox="618 1703 919 1730">As for No. 1 artificer mule.</p> |

Detail of Packing—*continued.*

| Mule. | Articles Carried. |
|---|---|
| No. 3 Artificer Mule— <i>continued.</i> | <p>LOAD.</p> <p>2 artificers' boxes, Clarkson's— Containing— Tools, wheelers'. 2 tool holdalls, artificers'. 2 sets extra tools for holdalls. 1 set line gear. 1 nose bag. 1 canvas cover. 1 great coat.</p> <p><i>Total weight 222$\frac{3}{4}$ lb.</i></p> |
| BAGGAGE MULE. | <p>SADDLERY.</p> <p>1 set M.B. harness, baggage mule (<i>vide</i> list, p. 45). 1 packsaddle, G.S., with 4 girth straps, and pannels. 1 strap, cloak and line gear. 1 set, ropes, loading.</p> <p>LOAD.</p> <p>1 set line gear. 1 nose bag. 1 canvas cover, 6 ft. × 6 ft. 1 great coat. 1 forage cord. Baggage or stores, about 150 lbs.</p> <p><i>Total weight about 230 lb.</i></p> |

NOTES ON PACKING.

Canvas Covers.

All canvas covers for harness are carried folded over the tops of the cradles and under the loads.

Two canvas covers, 6 ft. × 6 ft., Field Hospital, are issued to every officer's baggage and kit mule,

Kits.

Kits are carried rolled up in canvas covers, 3 in each.

Great coats.

Great coats are carried folded the length of the line gear roll, i.e., 30 inches, and laid on top of it, enclosed in line gear straps.

Kneecaps.

Black leather kneecaps are carried by Nos. 1 to 7 of each subdivision.

Tents.

Extra mules are provided for the carriage of tents when issued.

Line Gear.

The line gear of the barebacked mules is carried by the spare baggage mules except the blankets, web surcingles, and pads, which are carried by the barebacked mules themselves.

Mallets.

One "Mallet, wood, handled, heel peg," is carried on each officer's baggage and kit mule.

Harness Brushes and Hoof Pickers.

These are issued at the rate of one per mounted man, driver, and muleteer, and are carried in the line gear bags, except the hoof pickers of the mounted men, which are carried on the near shoe pocket strap.

Scissors.

Three pairs of trimming scissors per subdivision are carried in the line gear bags.

Shoes.

When shoes are required for the mules, a proportion will be carried in the line gear bags, each set, with its nails, being sewn up in canvas.

Camp Kettles.

Camp kettles are carried in nests of five in the racks in which they are issued. These racks are packed in sacks.

Linch Pins and Washers.

These are carried in pockets by Nos. 2 and 3 of detachments. A spare linch pin and washer are carried in the leather pocket on each wheel and axle cradle.

Sights.

Spare fore sights (one per two guns) and spare tangent sights are carried in the leather case for spare parts on the carriage mule.

Mekometers.

A set is issued and carried in No. 1 subdivision, either by the range taker or on spare baggage mule.

Holdalls, Artificers'.

The tools for these are selected by the artificers from those in their boxes, for emergencies, when the artificers accompany the battery, but their mules are not up with it.

The holdalls may, in this case, be carried on the pioneer mules, or by the artificers themselves.

Lanterns.

Two "lanterns, tent, folding," are carried.

Materials for Repair and Spare Articles of Equipment.

A small quantity of materials for repair is carried in the artificers' boxes; the remainder, together with spare articles of equipment, is carried on the store mules in "valises, Q.M. stores," issued for the purpose.

PACKSADDLERY.

ARTILLERY PACKSADDLE (ORDNANCE).

Each artillery packsaddle consists of one cradle and two pannels.

Cradles.

The cradles differ in construction according to the purpose for which they are intended, *i.e.*, for carrying the gun, carriage, ammunition, &c.

A wide strip of leather is attached at the top of the side bars to prevent anything falling between the pannels and the animal's back.

Each arch plate, except ammunition cradle, is furnished with two hooks to carry a nose-bag, &c.; and the rear plate also has a staple for the crupper strap.

Pannels.

Each pannel consists of leather and collar cloth (thick serge), stuffed with horsehair. A leather patch is sewn on the outside both front and rear, having two holes for a strap to pass through for securing the cradle to the pannels, by which it is attached to the side bars. The stuffing can be re-arranged, when necessary, through an opening in the outer side, which is covered by a leather flap.

Cradle and Pannels.

Each cradle is fitted with pannels, breeching, breast collar, crupper, girth straps, girth, and surcingle.

Breeching.

The breeching is of seat hide, folded in three, with a leather chape sewn at each end for the dee, and chains by which it is attached to the cradle, and a leather chain piece to prevent chafing. Two leather tugs with buckles are sewn on the front for the hip strap, which passes through a loop on the crupper.

The hip strap is $1\frac{1}{4}$ inches wide and 40 inches long.

Collar, Breast.

This is similar to the breeching, but has a supporting strap instead of a loin strap.

Strap, Girth.

This is a plain strap, $1\frac{1}{2}$ inches \times 24 inches, doubled, with a wooden toggle sewn in the centre to prevent it slipping through the slots in the cradle.

Strap, Surcingle.

This is similar to the girth strap, but is 28 inches in length.

Girth.

This is of 4-inch hemp web, with a leather safe at each end, and a chape with a $1\frac{1}{2}$ -inch japanned roller buckle for attaching it to the girth straps.

A girth of tan coloured worsted web has been approved to supersede the above when the store is exhausted.

When it is necessary to shorten the length, a tuck may be sewn in the web.

Surcingle.

This is of similar web to the girth, with buckles at each end for attaching it to the straps on the cradles.

The chains, dees, and buckles are black japanned.

The head collar and chain, bridoon, bit, and reins of the G.S. Packsaddlery (see p. 44) are used to complete each set.

THE GENERAL SERVICE PACKSADDLE (BAGGAGE).

The iron work in general use is polished, but latest patterns have tinned chains, buckles, &c.

Each packsaddle consists of a saddletree and pannels.

Saddletree.

The small size saddletree is issued for baggage.

The tree (Marks I to III) consists of two iron arches having hanging hooks, and connected by two pedouk or sabieu side bars and two iron rods.

The Mark IV has steel arches, hooks, and rods (see Fig. 1, p. 42).

The Mark I bars are jointed to the arches to give an automatic fitting saddle.

Pannels.

(Fig. 1.)

Each pannel consists of leather back, white or tanned duck lining, and horsehair stuffing.

The stuffing can be adjusted as required and kept in position by additional spot stitches, if necessary.

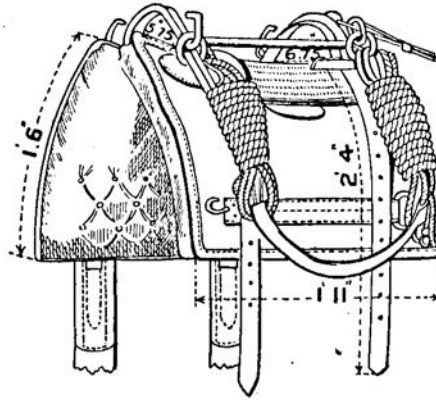


FIG. 1.

Breast Collar.

(Fig. 2.)

This is made of three folds of leather, and is fitted with a supporting strap similar to the breast collar for ordnance saddlery. The latest pattern has straps instead of chains.

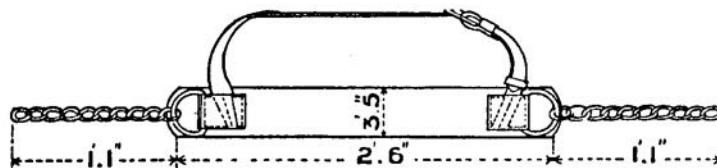


FIG. 2.

Breeching.

(Fig. 3.)

This is of one thickness of leather. It is fitted at each end with dees and chains or straps, and a loin strap with buckling piece.

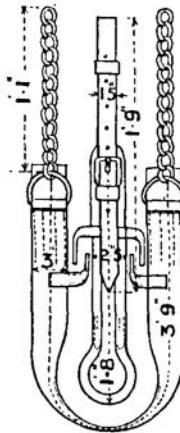


FIG. 3.

Crupper.

(Fig. 3.)

This is the small size, and has one attachment strap.

Bit, Bridoon.

This bit has T attachments which fit in the leather loops on the head collar. Mouth pieces are of two sizes, viz., 5-inch and 6-inch.

Girths.

(Fig. 4.)

These are of $3\frac{1}{2}$ -inch hemp web. Two joined by a connecting piece form the pair. The latest pattern Mark V is of brown worsted web, 4 inches wide.

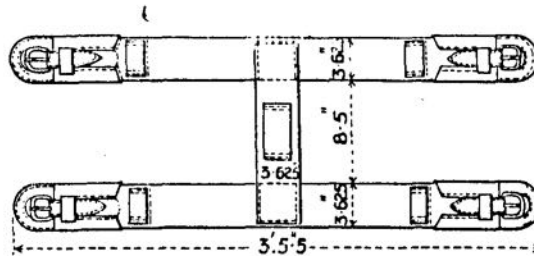


FIG. 4.

Straps, Girth.

These are made up with a loop at one end.

Girth straps of earlier pattern are permanently attached to the tree by screws.

Ropes, Baggage.

These are 13 feet 6 inches in length, of $1\frac{1}{2}$ -inch white rope, or hemp $1\frac{1}{4}$ -inch, Mark I, fitted with tinned iron rings and a connecting strap.

HARNESS.

A set consists of:--

ORDNANCE MULES.

Packsaddlery, Artillery.

| | | | | | Weight. | |
|-----------------------------------|-----|-----|-----|-----|---------|-----------------|
| | | | | | lb. | oz. |
| 1 breeching, with loin strap | ... | ... | ... | ... | 3 | 11 |
| 1 collar, breast, with neck strap | ... | ... | ... | ... | 2 | $11\frac{1}{2}$ |
| 1 crupper, with strap | ... | ... | ... | ... | 1 | 3 |
| 2 girths, web | ... | ... | ... | ... | 2 | 14 |
| 4 straps, girth | ... | ... | ... | ... | 2 | 3 |
| 2 straps, surcingle* | ... | ... | ... | ... | — | — |
| 1 surcingle, web* | ... | ... | ... | ... | — | — |
| 1 pair of pannels | ... | ... | ... | ... | 20 | $12\frac{1}{2}$ |

Packsaddlery, G.S.

| | | | | | | |
|--|-----|-----|-----|-----|----|----|
| 1 chain, collar | ... | ... | ... | ... | 2 | 4 |
| 1 bit, bridoon, without rein | ... | ... | ... | ... | 0 | 15 |
| 1 collar, head, with ring on nose band, Mk. IV | ... | ... | ... | ... | 1 | 12 |
| 1 rein, bridoon, with iron stops | ... | ... | ... | ... | 0 | 10 |
| Total | ... | ... | ... | ... | 39 | 0 |

* For "Top Loads" only, weight 3 lb.

Line Gear.

(Ordnance Mule.)

| | lb. | oz. |
|---|-----|------------------|
| 1 blanket, shaped | 12 | 12 |
| 1 blanket | | |
| 1 dunderstick (mules only) | 1 | 6 |
| 1 bag, line gear | 1 | 2 |
| containing— | | |
| 1 headstall | 2 | 12 |
| 1 heel rope | 1 | 6 |
| 1 watering bridle (complete) | 1 | 8 |
| 2 iron pins | 4 | 5 |
| 1 shackle (fore foot) | 2 | 1 |
| 1 „ (hind foot, prs.) | 1 | 9 |
| 1 roller and pad | 1 | 14 |
| 1 rubber, hand | 0 | 7 |
| 1 brush, horse... .. | 0 | 10 |
| 1 „ harness (horses and saddled mules only) | 0 | 7 |
| 1 sponge | 0 | 0 $\frac{3}{4}$ |
| 2 cloths, dusting | 0 | 8 |
| 1 currycomb | 0 | 6 |
| 1 eye-fringe | 0 | 9 |
| | 33 | 10 $\frac{3}{4}$ |
| The whole being strapped in one pair of line gear straps | 2 | 2 |
| Total weight | 35 | 12 $\frac{3}{4}$ |

BAGGAGE MULES.

Packsaddlery, G.S.

| | Weight. | |
|--|---------|-----|
| | lb. | oz. |
| 1 bit, bridoon, without rein | 0 | 15 |
| 1 breeching | 2 | 11 |
| 1 collar, breast | 2 | 9 |
| 1 collar, head, with ring on nose band | 1 | 11 |
| 1 crupper... .. | 1 | 0 |
| 1 pair girths, web | 2 | 6 |
| 1 rein, bridoon, with iron stops | 0 | 10 |
| 2 pairs of baggage ropes (one set) | 6 | 6 |
| 1 surcingle | 1 | 9 |
| | 19 | 13 |
| 1 packsaddle, G.S., with 4 girth straps and pannels | 26 | 0 |
| Total | 45 | 13 |

N.B.—All mules except those of 1st line and spare carriage mules carry, in addition, 1 strap, cloak and line gear, weight 1 lb. 8 oz.

Case, spare parts.

| | lb. | oz. |
|--|-----|------------------|
| Case, empty... | 1 | 4 $\frac{1}{2}$ |
| 1 catch, retaining breech screw | 0 | 1 $\frac{1}{2}$ |
| 1 gauge, striker protrusion | 0 | 0 $\frac{1}{2}$ |
| 1 pin, axis, catch retaining breech mechanism lever | 0 | 0 $\frac{1}{2}$ |
| 5 pins, firing | 0 | 3 $\frac{1}{2}$ |
| Pins, keep, split— | | |
| 2—1 $\frac{1}{4}$ -in. \times $\frac{1}{8}$ -in. } | 0 | 0 $\frac{1}{2}$ |
| 2—1-in. \times $\frac{1}{8}$ -in. } | | |
| 2 plugs, filling hole, hydraulic buffer | 1 | 8 |
| 2 rings, packing, { V section } | 0 | 2 |
| 1 sight, fore (spare) | 0 | 1 |
| 1 „ tangent, (spare, 1 per 2 guns) | 0 | 14 $\frac{1}{2}$ |
| 1 spring, catch retaining breech mechanism lever | 0 | 0 $\frac{1}{2}$ |
| 3 springs, main | 0 | 7 |
| 1 striker | 0 | 12 |
| 1 trigger sear | 0 | 4 |
| 1 set, washers, packing (set of 6) | 0 | 1 $\frac{1}{2}$ |
| | 5 | 13 $\frac{1}{2}$ |

Case tools.

| | lb. | oz. |
|--|-----|------------------|
| Case, empty... | 1 | 6 |
| 1 drift, brass, $\frac{1}{2}$ -in. \times 10-in. | 0 | 11 |
| 1 „ steel, $\frac{3}{16}$ -in. \times 5-6-in. | 0 | 2 |
| 1 driver, screw, G.S. 4-in.... | 0 | 3 $\frac{1}{2}$ |
| 1 hammer, fitters', 16 oz. (handled) | 1 | 6 |
| 1 lanyard, firing | 0 | 1 |
| 1 } spanner, hydraulic buffer, { No. 118 | 2 | 5 |
| 1 } { No. 119 | 0 | 11 $\frac{1}{2}$ |
| 1 } { No. 120 | 0 | 13 |
| 1 tommy | 0 | 15 |
| 1 tool, assembling springs... | 0 | 6 |
| | 9 | 0 |

MAN TRANSPORT.—JUNGLE EQUIPMENT.

Dismount gun and cradle and remove wheels as laid down at page 9.

The loads will be as follows :—

1. Cradle load :—

Cradle with—

| | | | |
|--------------------------------------|-----|-----|---------------------|
| 1 cap, foresight | ... | ... | on foresight |
| 2 caps, piston rod | ... | ... | on piston rods |
| 1 cleaner, cradle | ... | ... | in cradle cylinder |
| 1 traversing handspike | ... | ... | } lashed to cradle |
| 2 check ropes | ... | ... | |
| 2 tampecons, cradle (front and rear) | ... | ... | on cradle |
| 1 sight, tangent | ... | ... | in pocket on cradle |
| 1 brush, bore, with wood stave | ... | ... | } lashed to cradle |
| 1 cap, sponge, No. 6, for cleaner | ... | ... | |

Total weight about 218 lb.

2. Trail load :—

1 trail with—

- 1 axletree
- 1 elevating gear
- 2 aiming posts

Total weight about 238 lb.

3. Gun load :—

1 gun

Total weight about 235 lb.

4. Wheel load :—

1 wheel

Total weight about 69 lb.

5. Wheel load :—

1 wheel

Total weight about 69 lb.

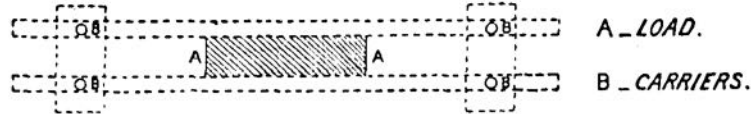
6. Box, spare parts, &c., load :—

1 box, containing—

- 2 cases, leather, for spare parts and tools
- 2 files
- 3 lb. mineral jelly in cylinder
- 7 pints mineral oil in can
- 2½ pints Rangoon oil in can
- 1 lb. grease in box
- 3 sponge cloths
- 1 clinometer, field
- 1 spring hydraulic buffer

Total weight 60 lbs.

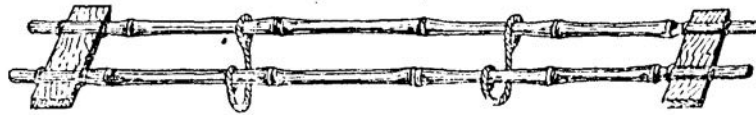
The following diagram shows the position of the carriers in plan:—



The wheels are carried as they are, on the head of a carrier—



Gun Bearer.



Two stout bamboos, 8 to 10 feet long, connected about a foot from either end by two pieces of board, sufficiently broad to allow two men to stand side by side underneath. These boards rest on the head pads of the carriers. Two carriers abreast to each board.

Slings of $2\frac{1}{2}$ -inch tarred rope, or stout leather, are attached to the centre of the bearer, as in sketch, for the purpose of taking the load in the loop formed by them.

The bamboos should be about 18 inches apart.

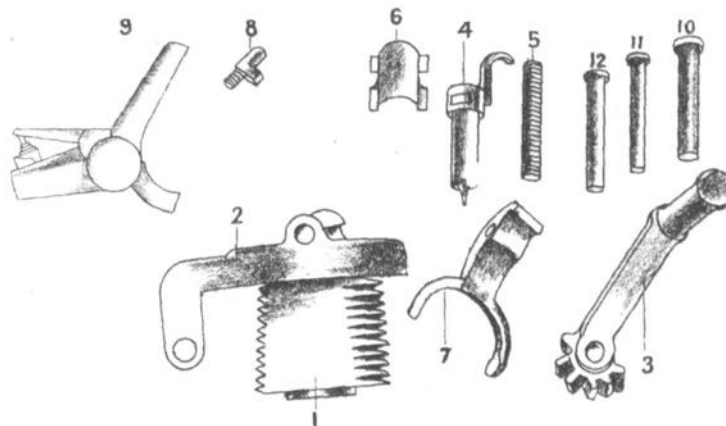
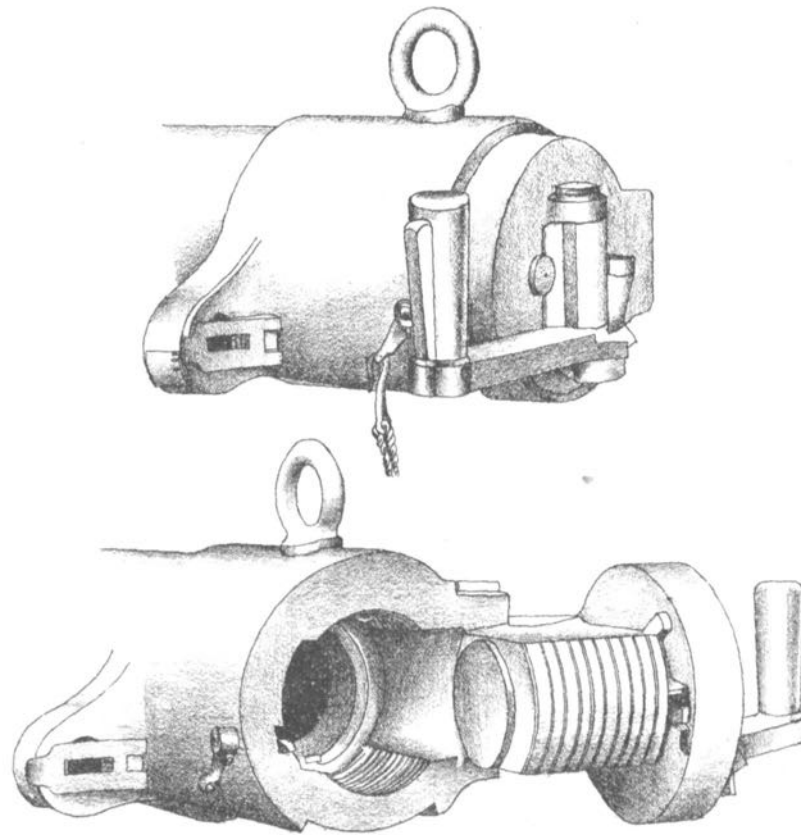
Order of March—

Trail,
Cradle,
Wheels,
Gun,
Ammunition.

The Nos. 1 leading and a gunner between every two or three carriers.

LONDON:
PRINTED FOR HIS MAJESTY'S STATIONERY OFFICE,
BY HARRISON AND SONS, ST. MARTIN'S LANE,
PRINTERS IN ORDINARY TO HIS MAJESTY.

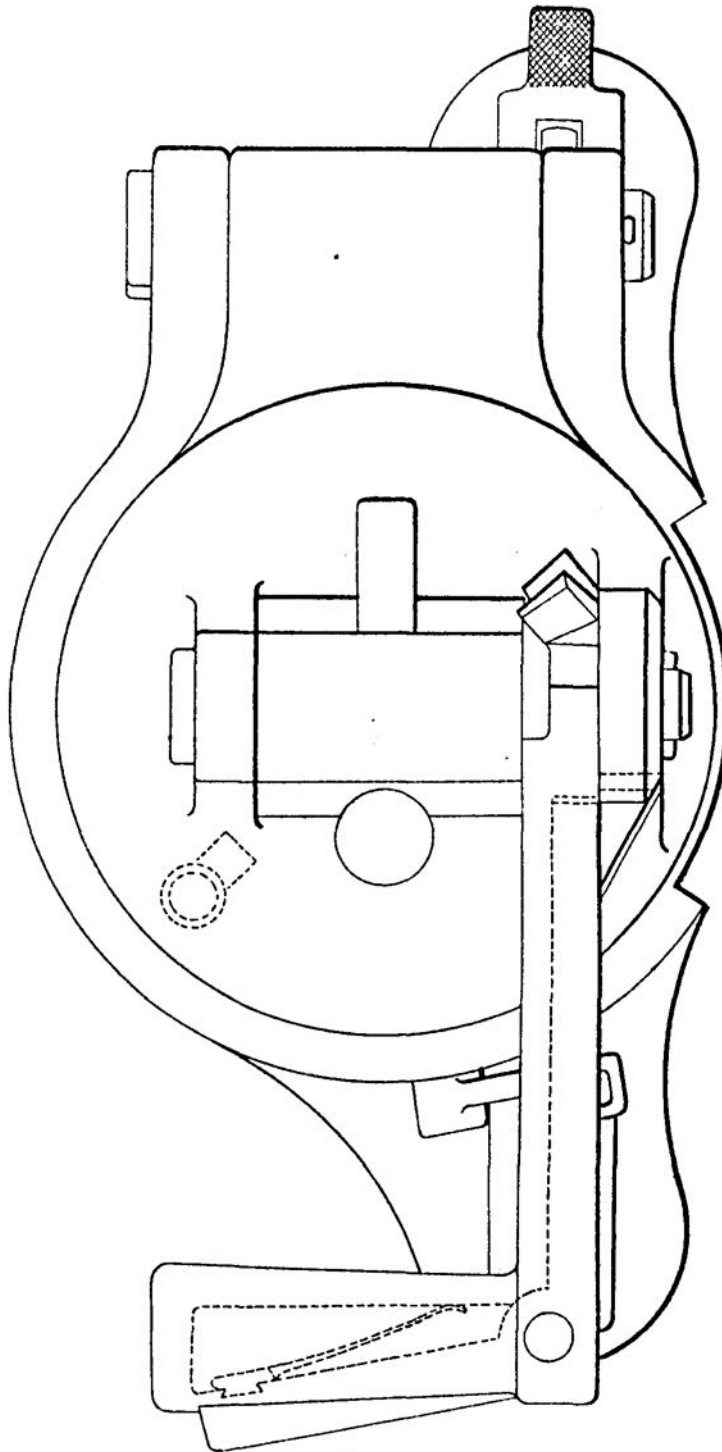
ORDNANCE, Q. F. 2.95 INCH MOUNTAIN, MARK I. BREECH MECHANISM.



- | | |
|----------------------------|---|
| 1.—Screw, breech. | 5.—Spring main. |
| 2.—Carrier. | 6.—Block guide striker. |
| 3.—Lever breech mechanism. | 7.—Extractor |
| 4.—Striker. | 8.—Catch retaining breech screw |
| 9.—Trigger, sear. | 10.—Bolt, hinge, carrier. |
| 11.—Bolt, hinge, extractor | 12.—Bolt, hinge, breech mechanism lever |

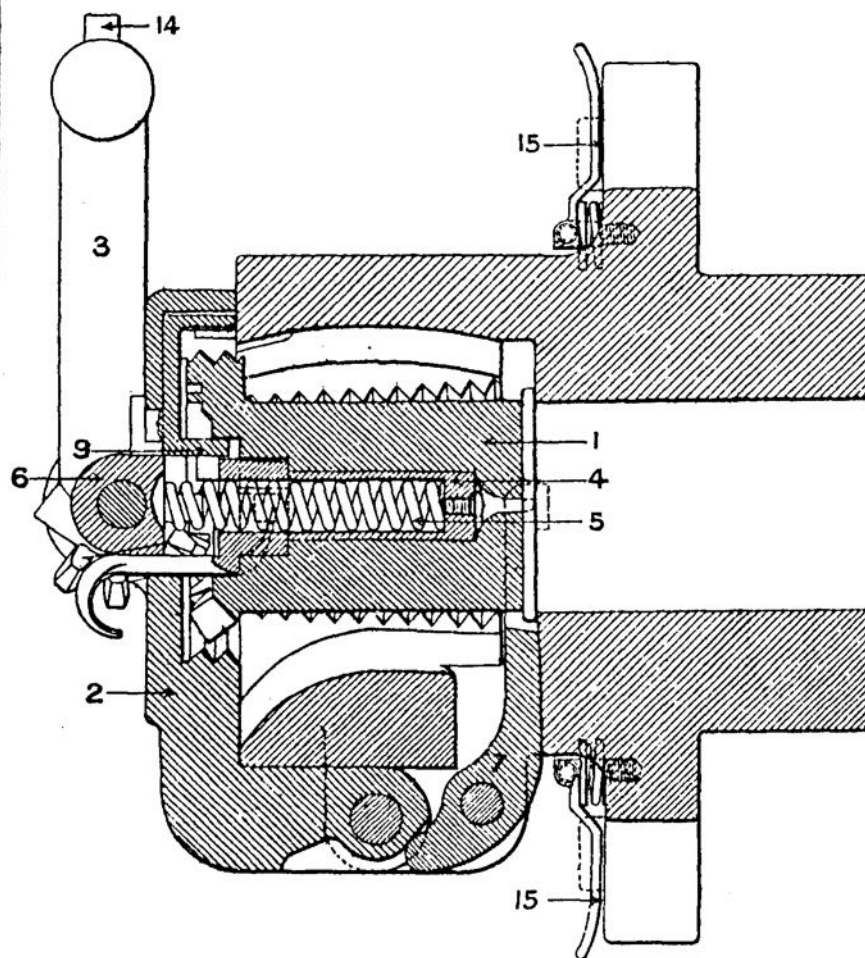
ORDNANCE, Q.F., 2.95 INCH, MOUNTAIN, MARK I.

BREECH CLOSED. REAR VIEW.



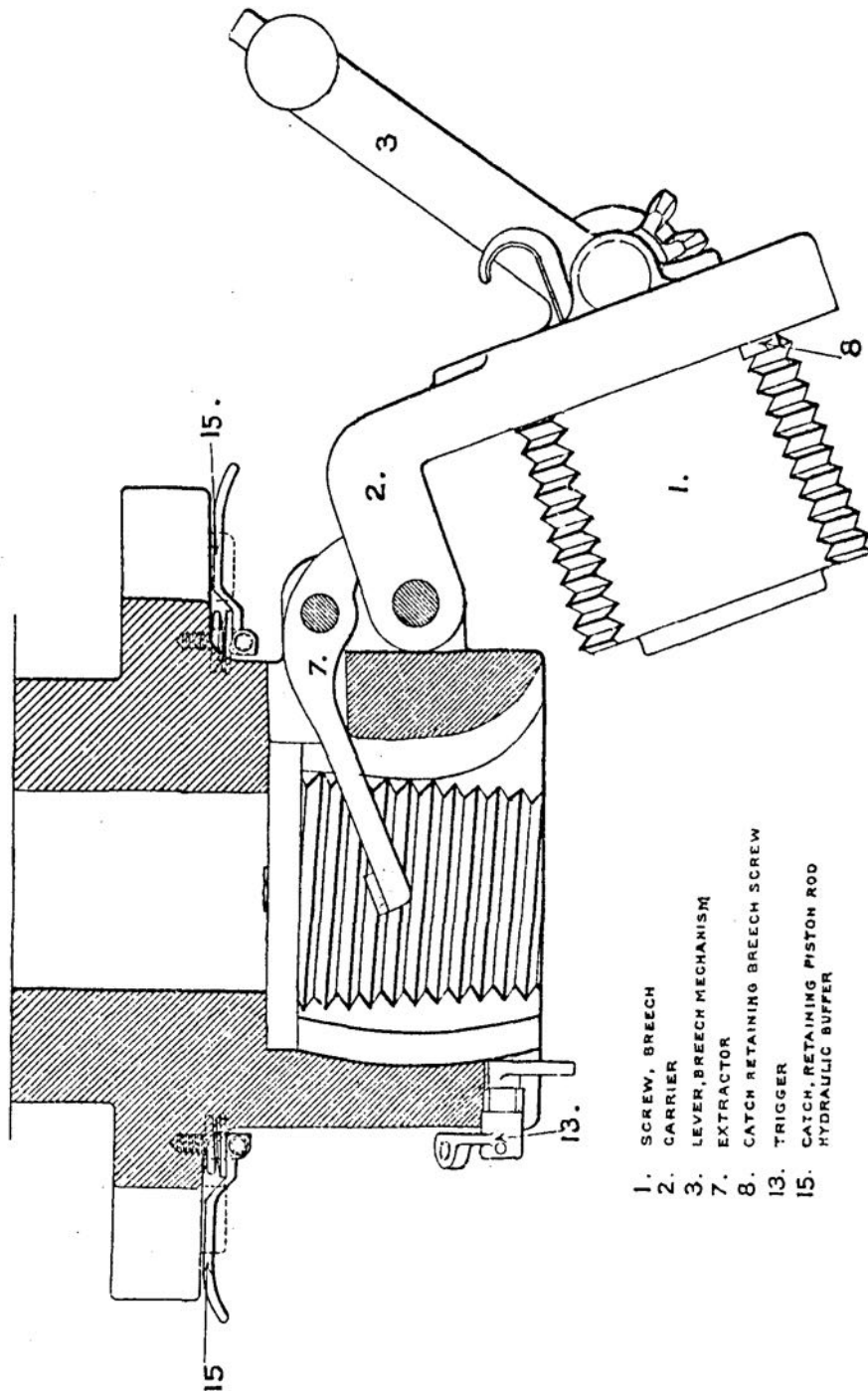
ORDNANCE, Q.F., 2.95 INCH MOUNTAIN, MARK I.

SECTIONAL PLAN, MECHANISM CLOSED.



- 1 SCREW, BREECH.
- 2 CARRIER
- 3 LEVER, BREECH MECHANISM
- 4 STRIKER
- 5 SPRING, MAIN
- 6 BLOCK, GUIDE, STRIKER
- 7 EXTRACTOR
- 9 TRIGGER SEAR.
- 14 CATCH, RETAINING BREECH MECHANISM LEVER
- 15 PISTON ROD, HYDRAULIC BUFFER

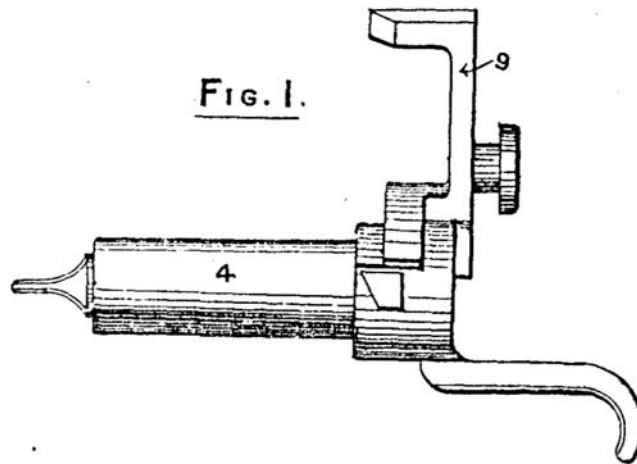
ORDNANCE, Q.F., 2.95 INCH MOUNTAIN, MARK I.
SECTIONAL PLAN, MECHANISM OPEN.



- 1. SCREW, BREECH
- 2. CARRIER
- 3. LEVER, BREECH MECHANISM
- 7. EXTRACTOR
- 8. CATCH RETAINING BREECH SCREW
- 13. TRIGGER
- 15. CATCH, RETAINING PISTON ROD HYDRAULIC BUFFER

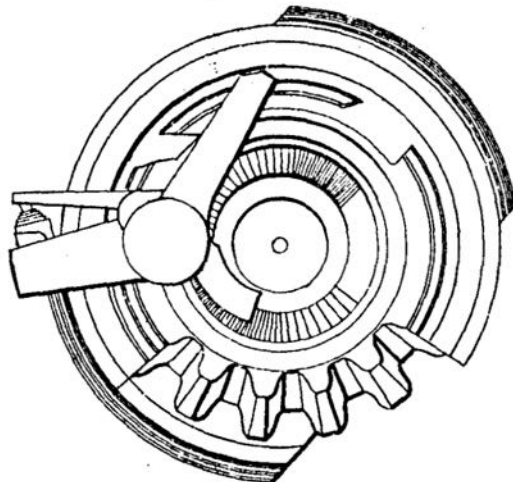
ORDNANCE, Q.F., 2.95 INCH MOUNTAIN, MARK I.

STRIKER (4) AND TRIGGER SEAR (9) IN COCKED POSITION.



REAR VIEW OF BREECH SCREW, SHOWING TRIGGER SEAR.

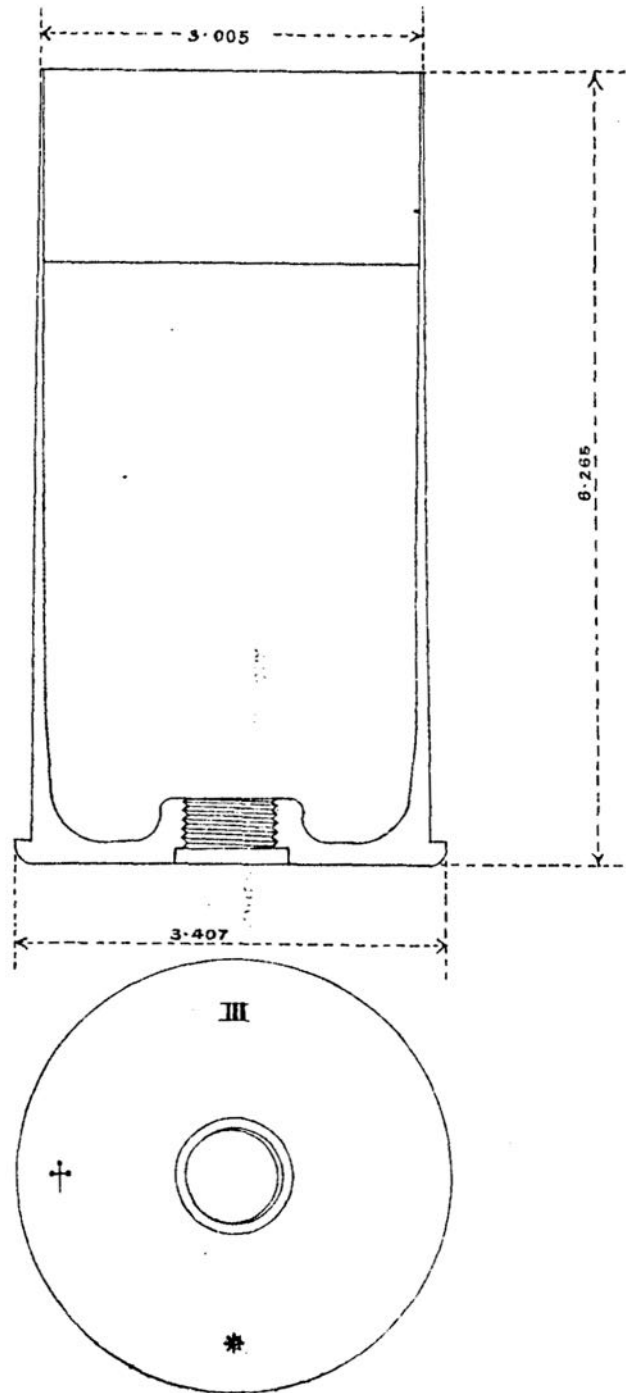
FIG 2.



CARTRIDGE, Q.F., 2.95 INCH. CASE, EMPTY, MARK III.

SCALE = $\frac{2}{3}$.

DIMENSIONS IN INCHES.

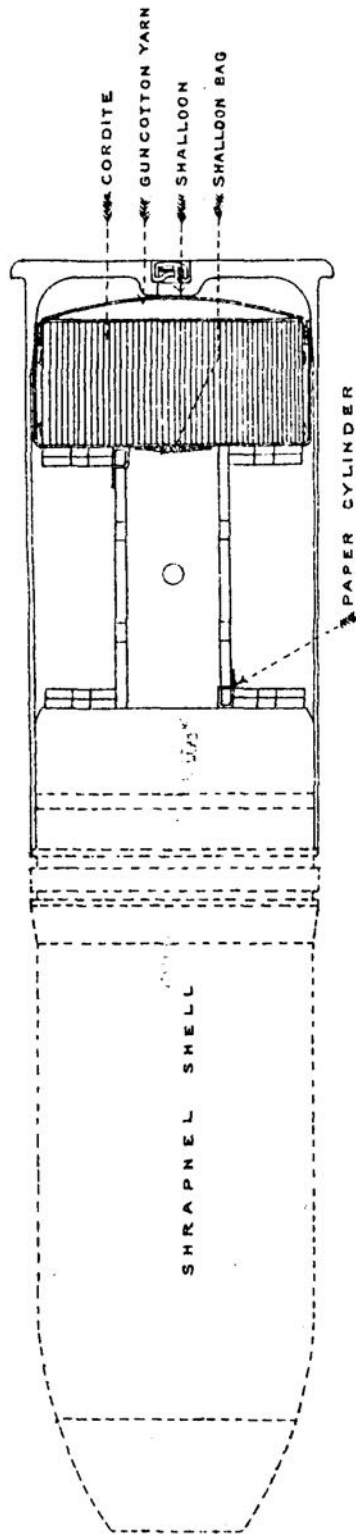


INVERTED PLAN

CARTRIDGE, Q.F., 2.95 INCH, CORDITE, SHRAPNEL SHELL, MARK I.

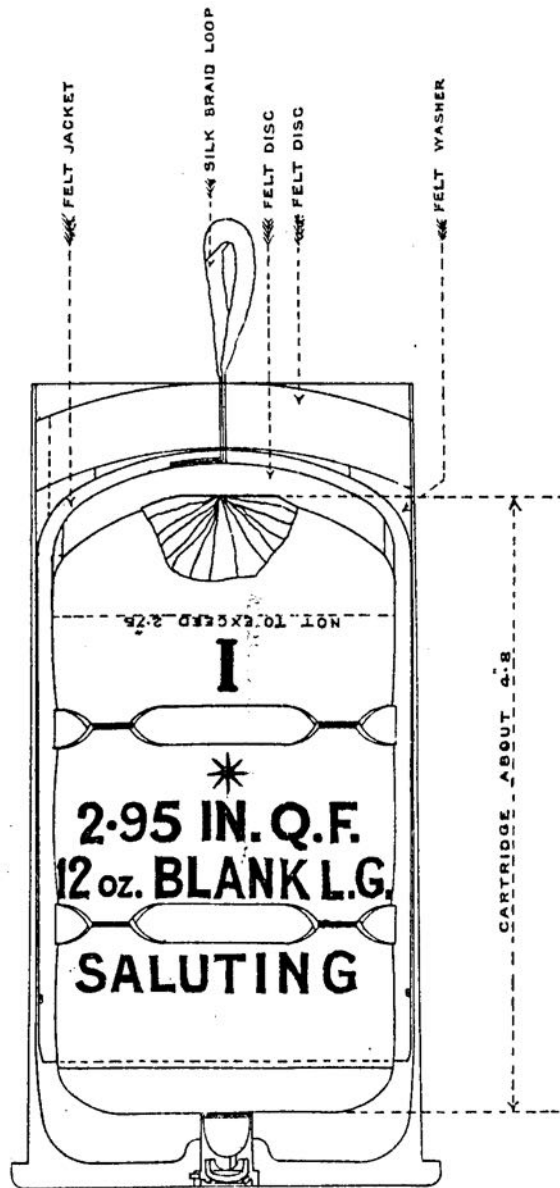
METHOD OF FILLING.

SCALE = 1/2



CARTRIDGE, Q.F., SALUTING, 2.95 INCH, FILLED, MARK I.

SCALE = $\frac{3}{4}$.

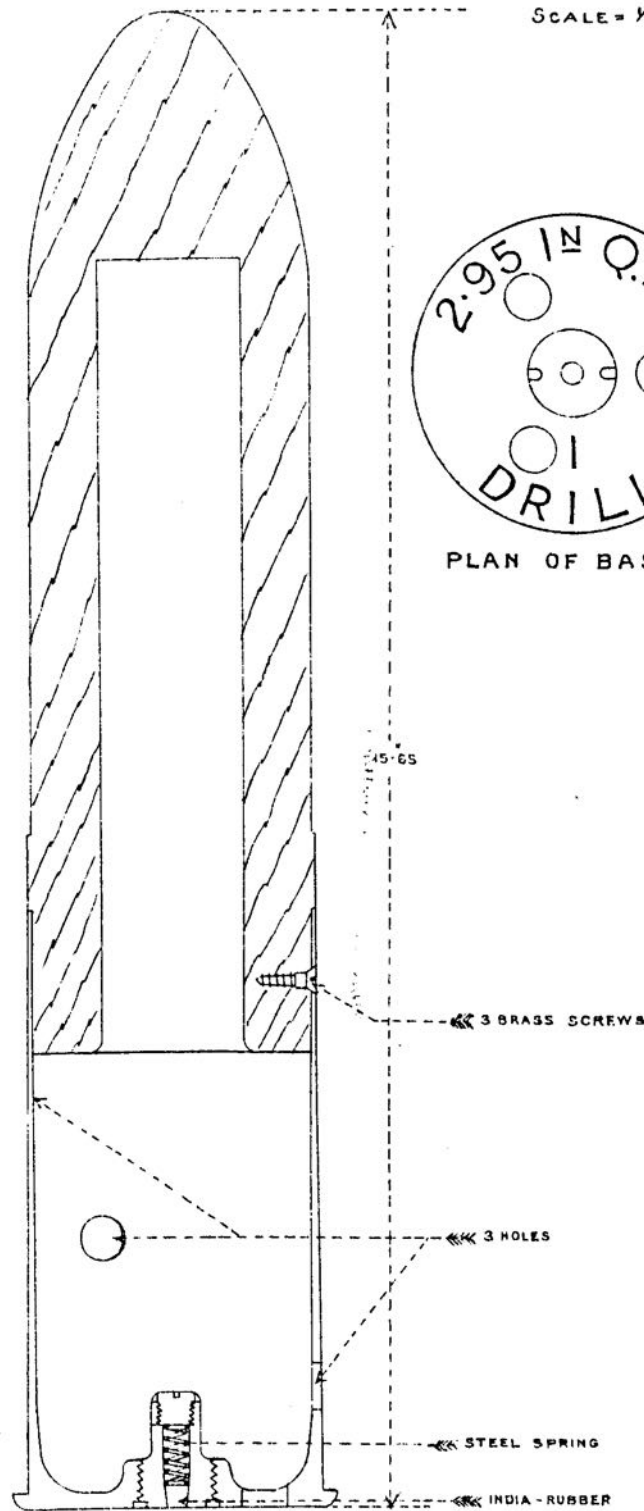


CARTRIDGE, Q.F., DRILL, 2.95 INCH. MARK I.

SCALE = 1/2.



PLAN OF BASE.



3 BRASS SCREWS

3 HOLES

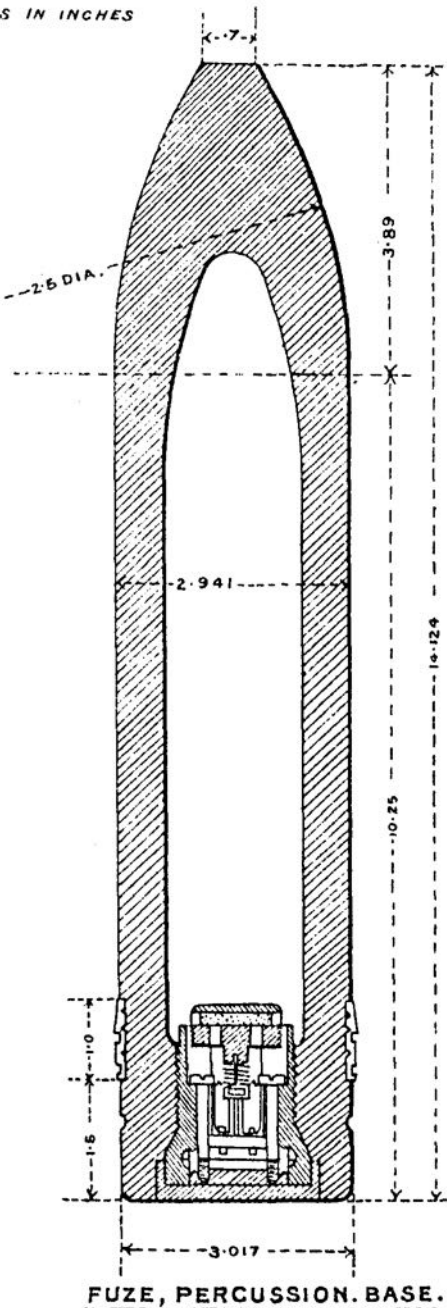
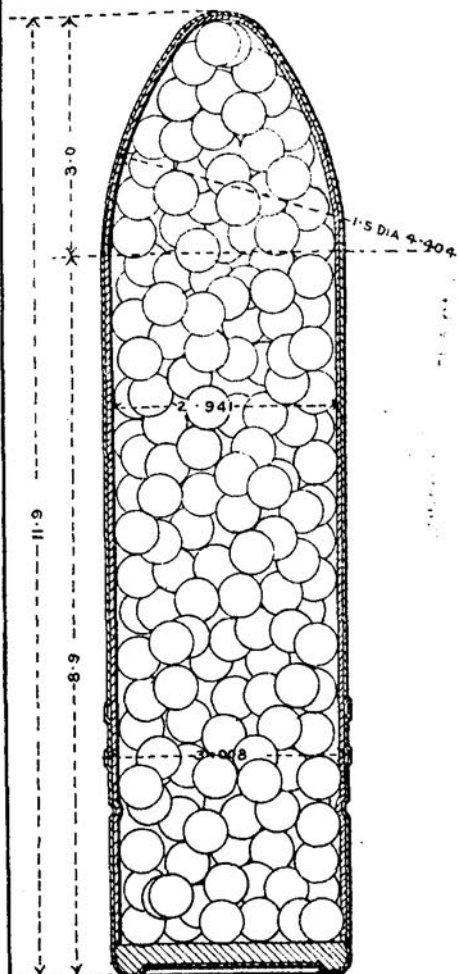
STEEL SPRING

INDIA-RUBBER

CARTRIDGE, Q. F., 2.95 INCH,
DOUBLE SHELL, MARK I.

DIMENSIONS IN INCHES

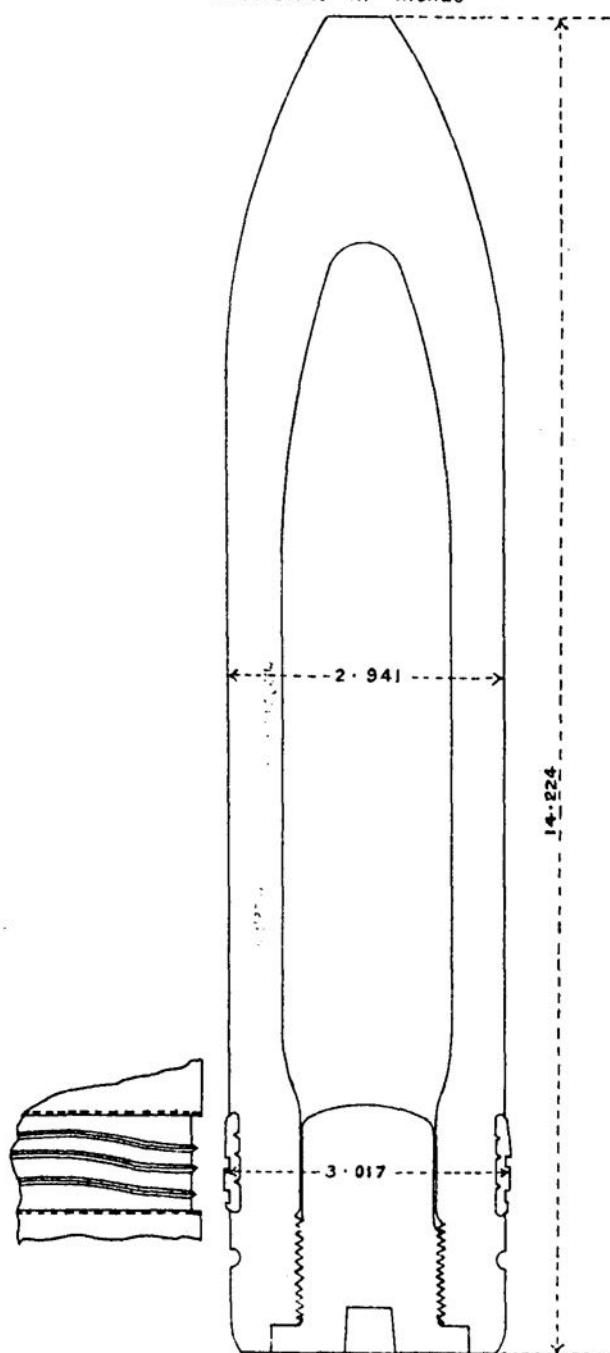
CARTRIDGE, Q. F., 2.95 INCH.
CASE SHOT, MARK I.



CARTRIDGE, Q.F., 2.95 INCH, DOUBLE SHELL, MARK III.

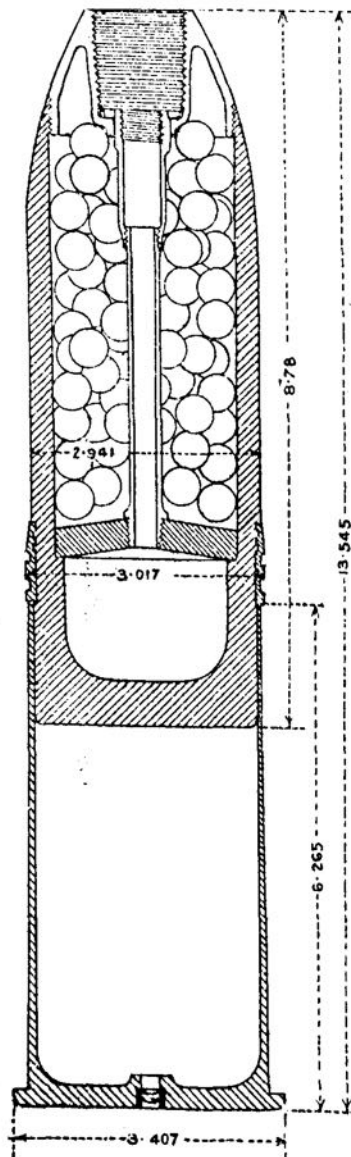
SCALE = $\frac{1}{2}$

DIMENSIONS IN INCHES



CARTRIDGE, Q.F., 2.95 INCH, SHRAPNEL SHELL, MARK I.

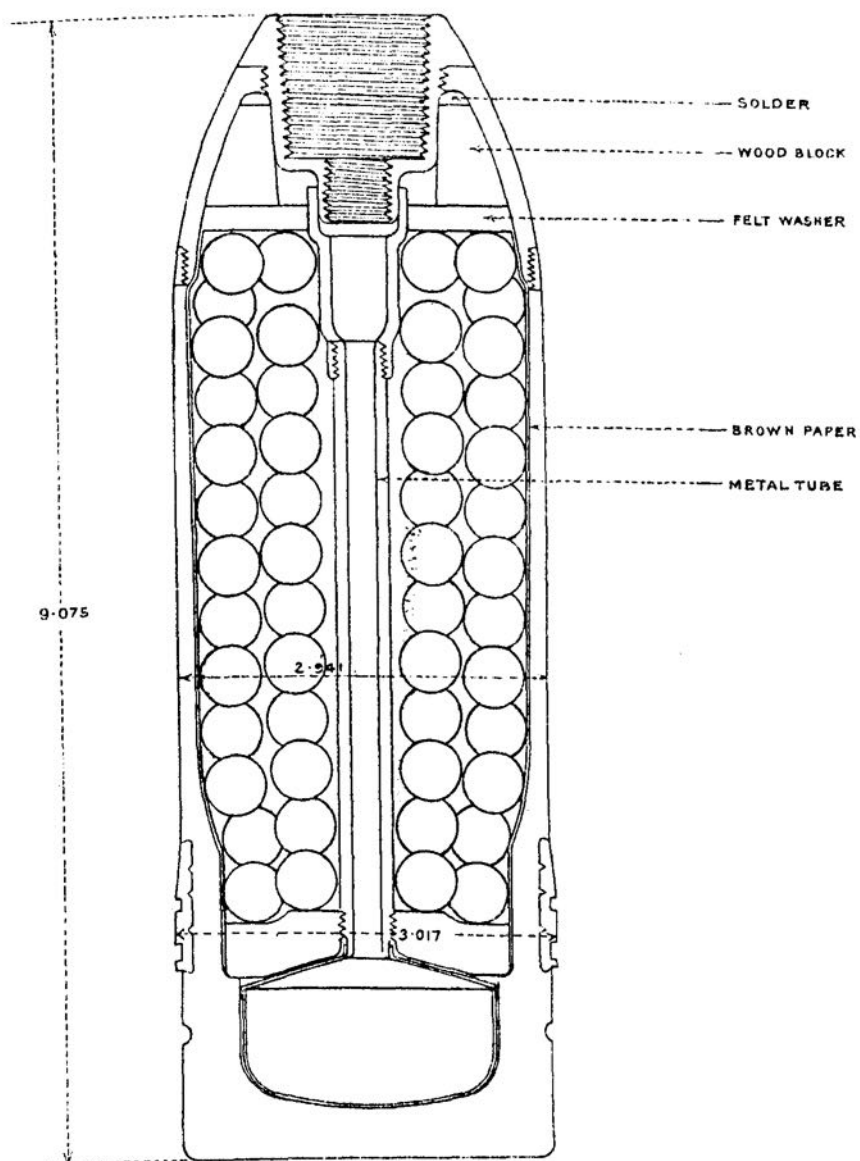
DIMENSIONS IN INCHES.



CARTRIDGE, Q.F., 2.95 INCH, SHRAPNEL SHELL, MARK II.

SCALE = $\frac{2}{3}$

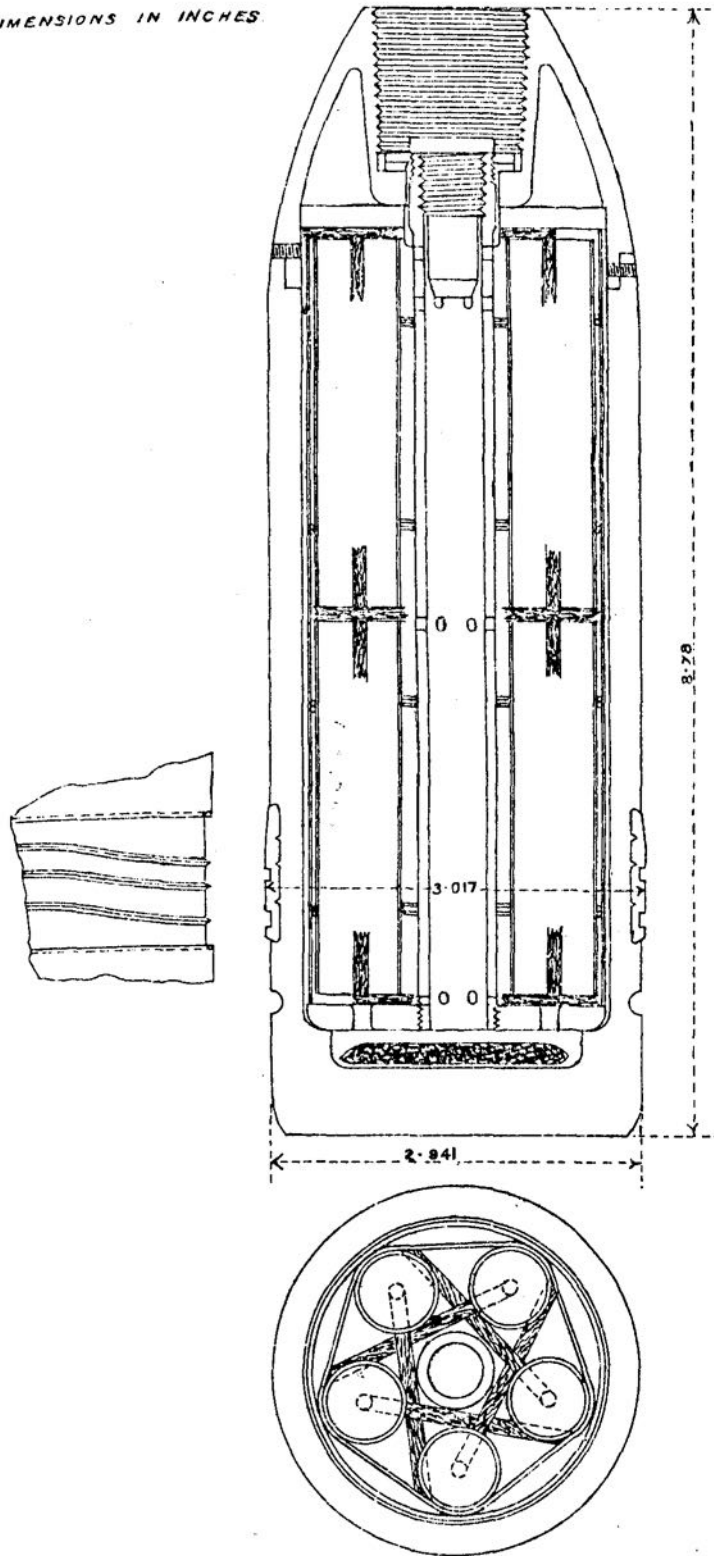
DIMENSIONS IN INCHES.



CARTRIDGE, Q.F., 2.95 INCH, STAR SHELL, MARK I.

SCALE $\frac{3}{4}$.

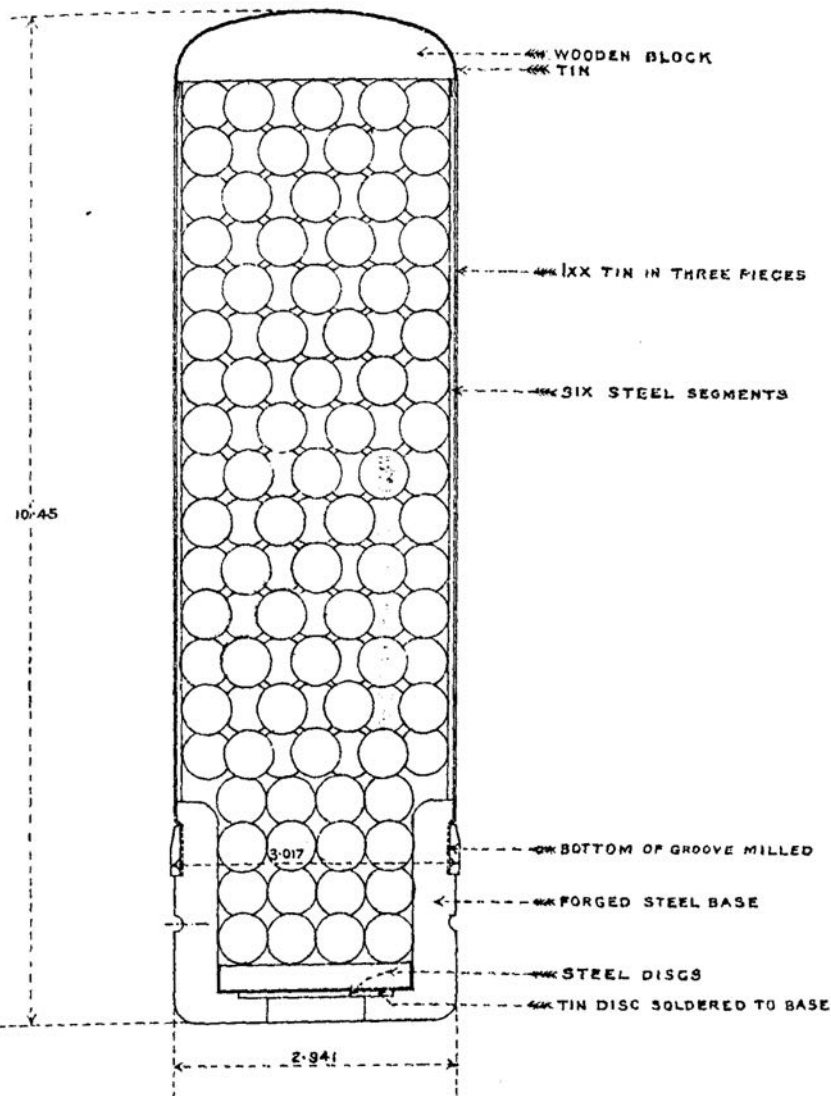
DIMENSIONS IN INCHES



CARTRIDGE, Q.F., 2.95 INCH, CASE SHOT, MARK II.

SCALE = $\frac{1}{2}$

DIMENSIONS IN INCHES.

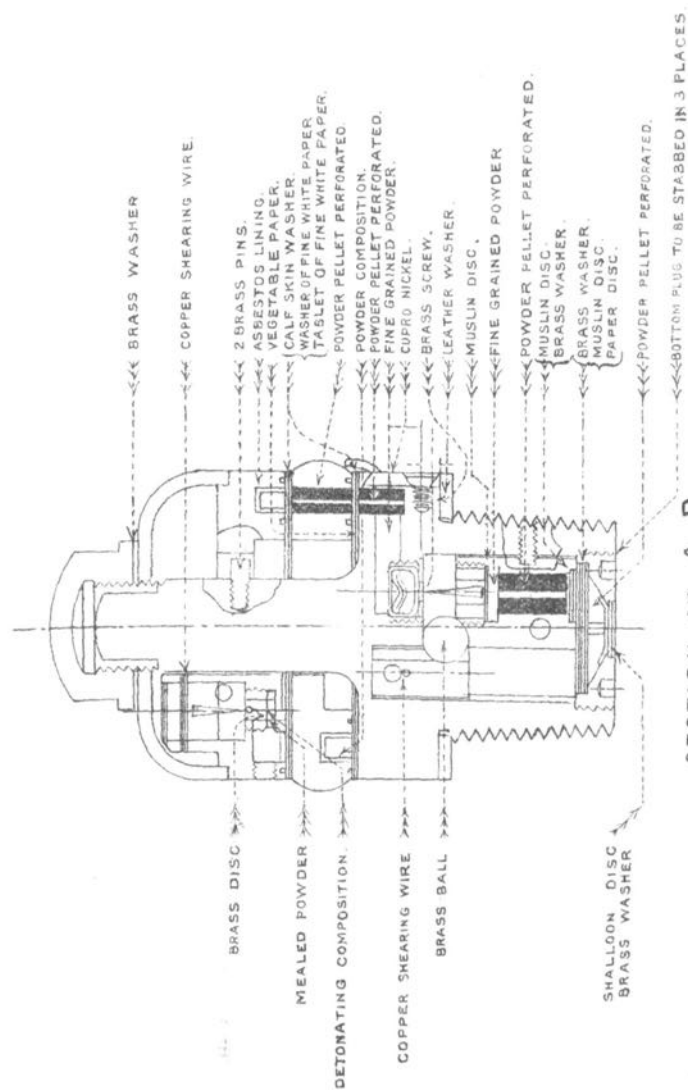
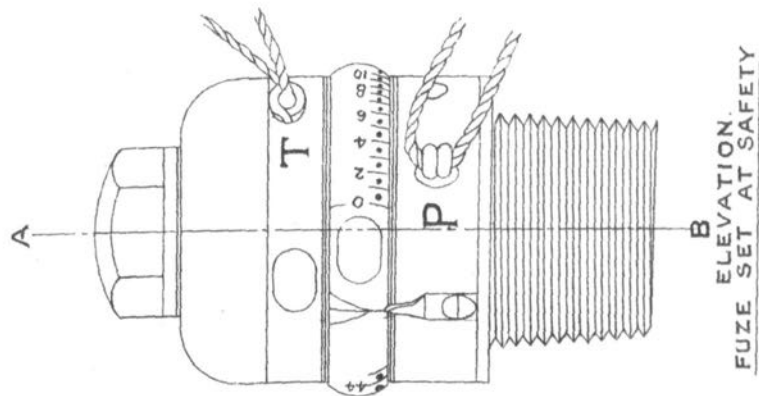


Full Sixe.



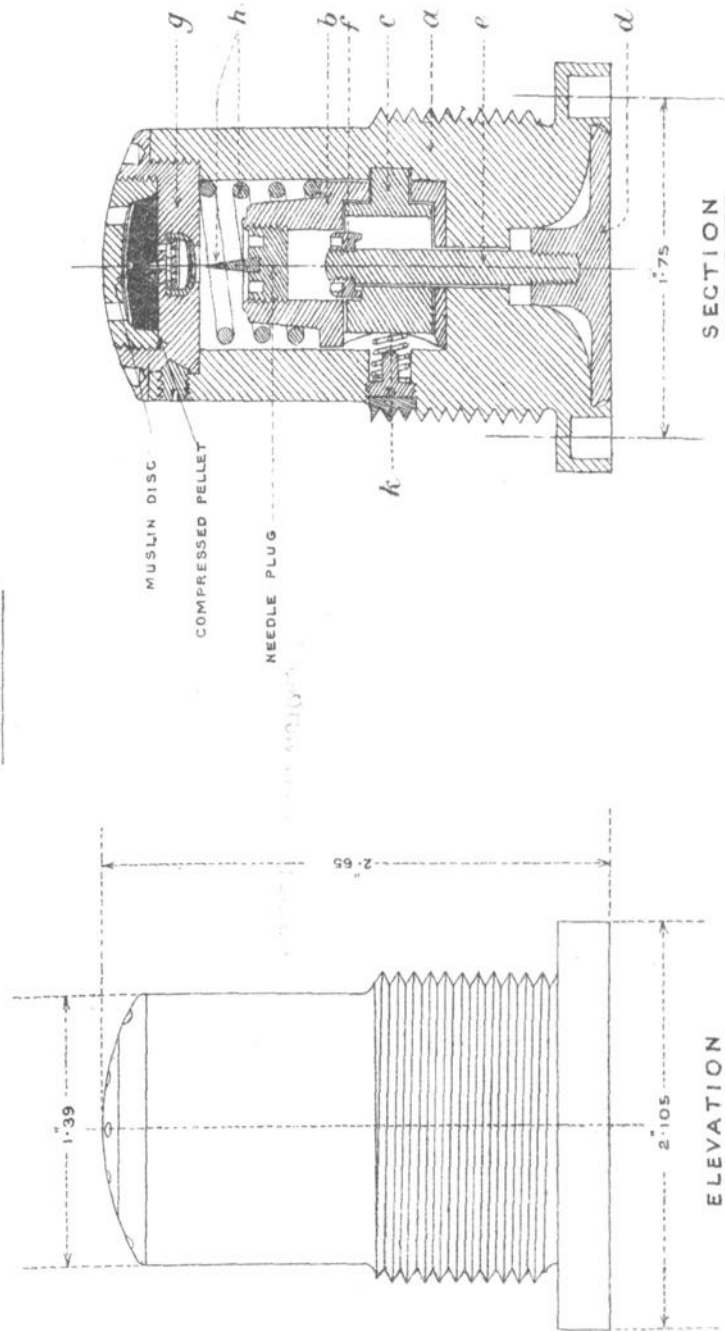
FUZE, TIME AND PERCUSSION, N° 60, MARK II.

FULL SIZE.

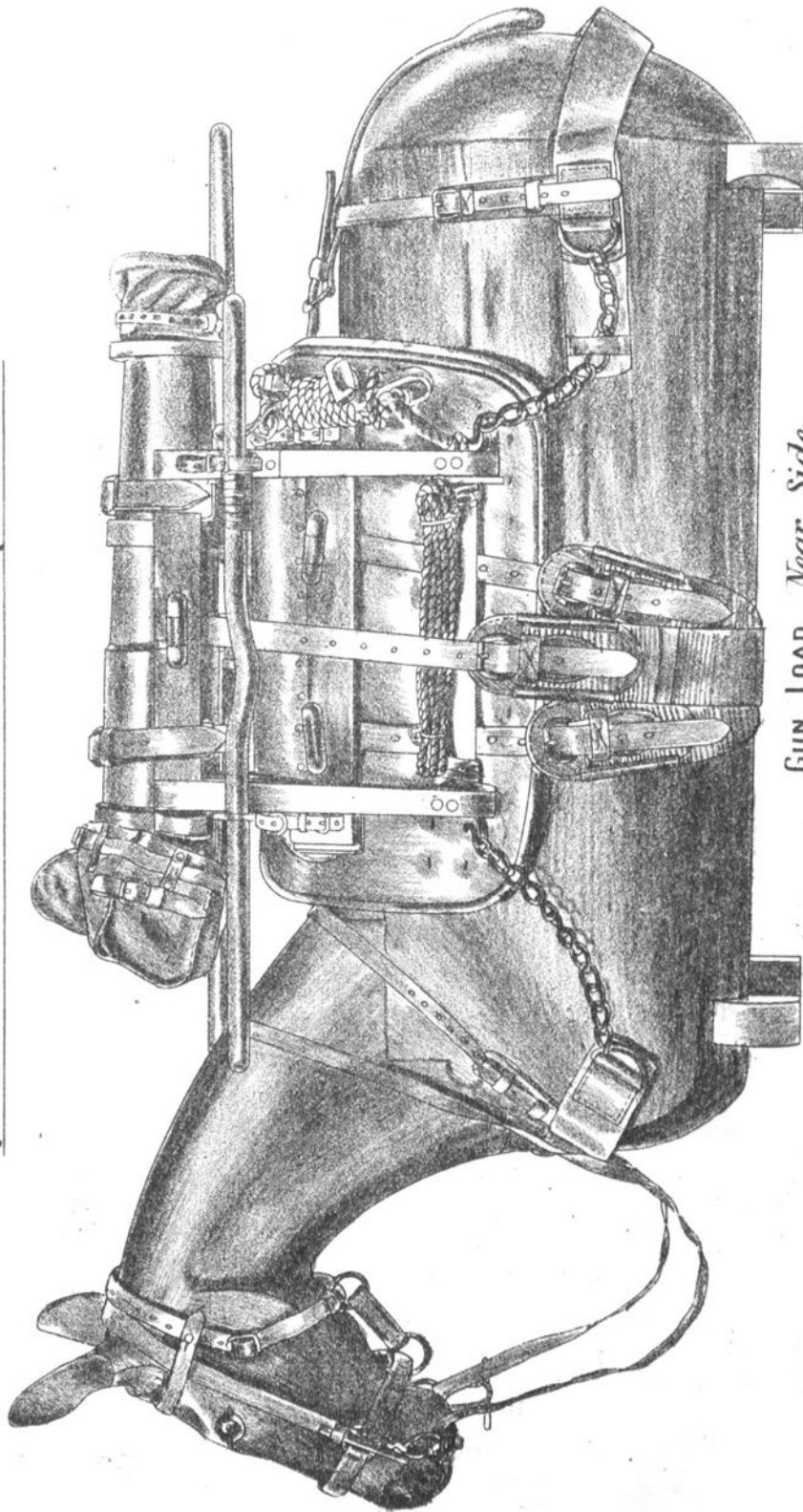


FUZE, PERCUSSION, BASE, MEDIUM, N^o 12, MARK I.

FULL SIZE.

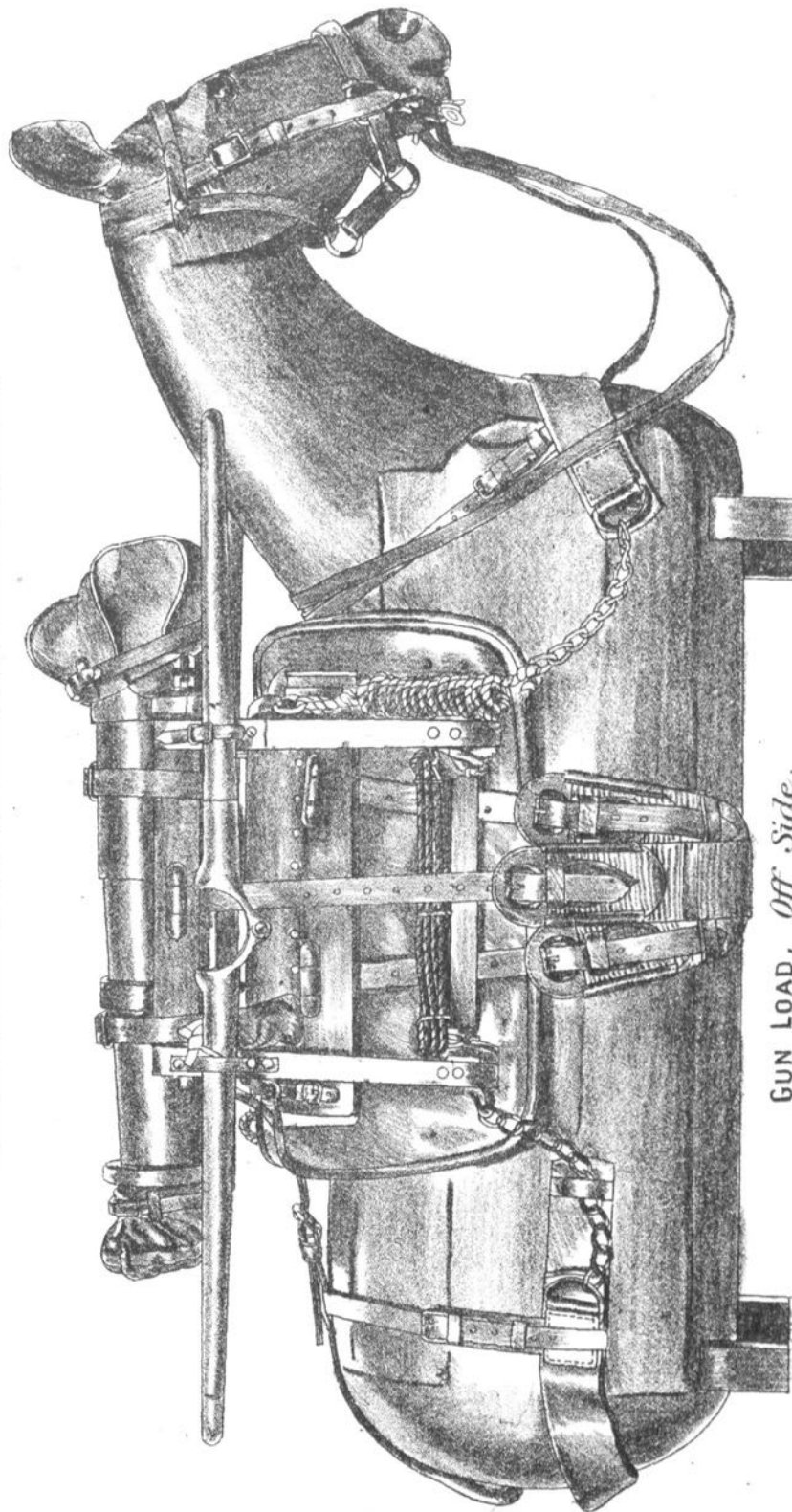


Q. F., 2.95 INCH MOUNTAIN EQUIPMENT.



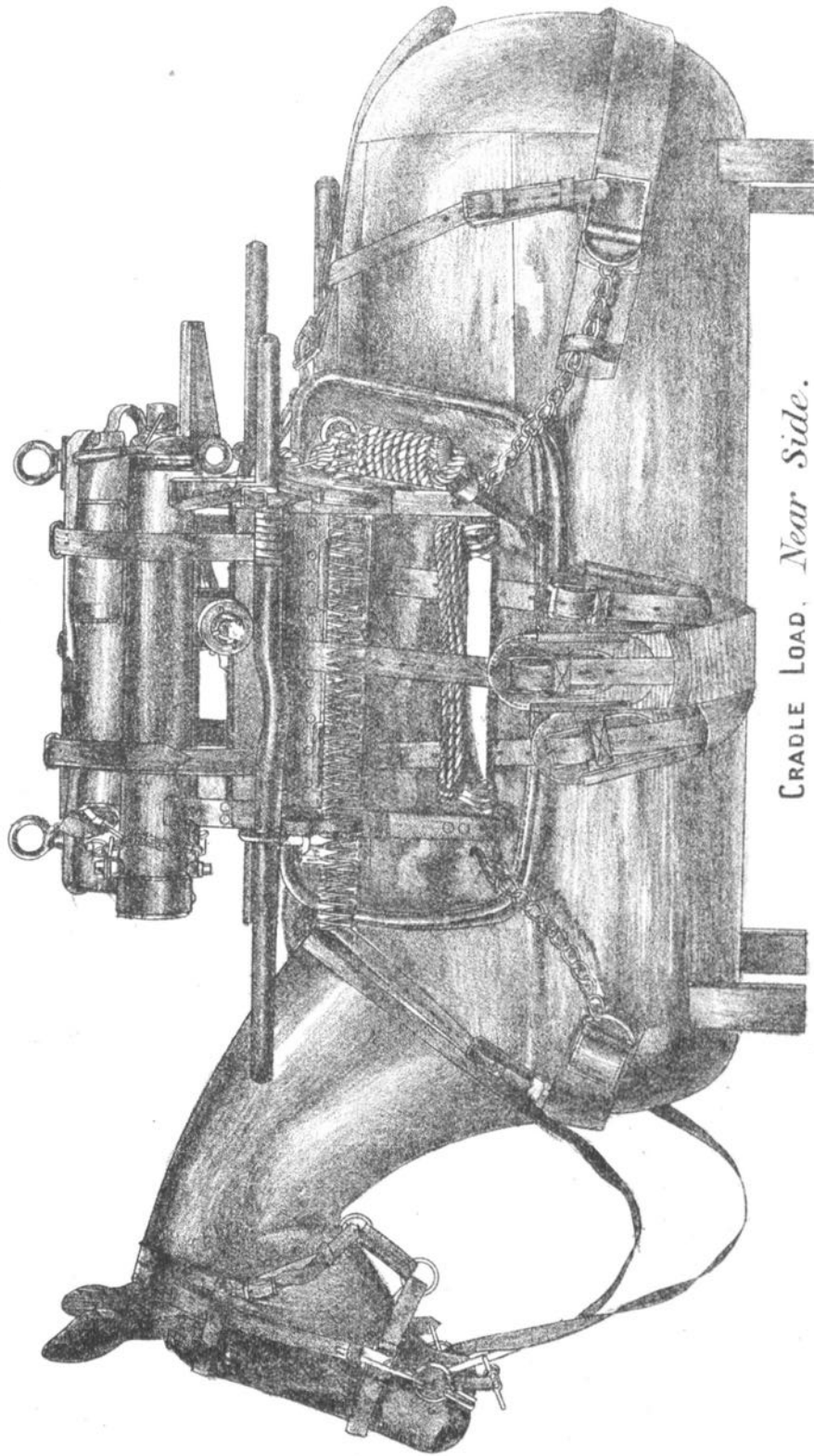
GUN LOAD, Near Side.

Q. F., 2·95 INCH MOUNTAIN EQUIPMENT.



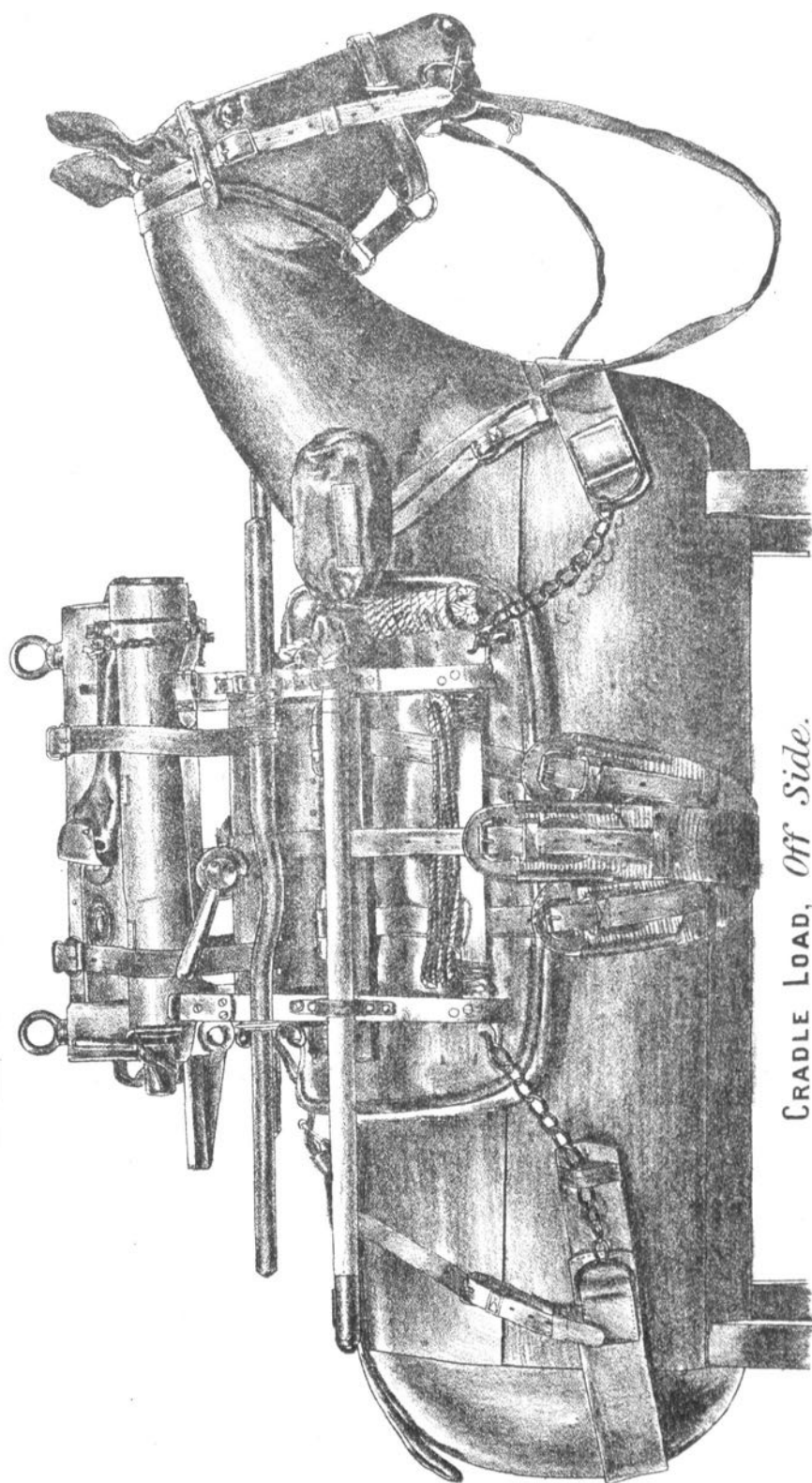
GUN LOAD, Off Side.

Q. F., 2·95 INCH MOUNTAIN EQUIPMENT.



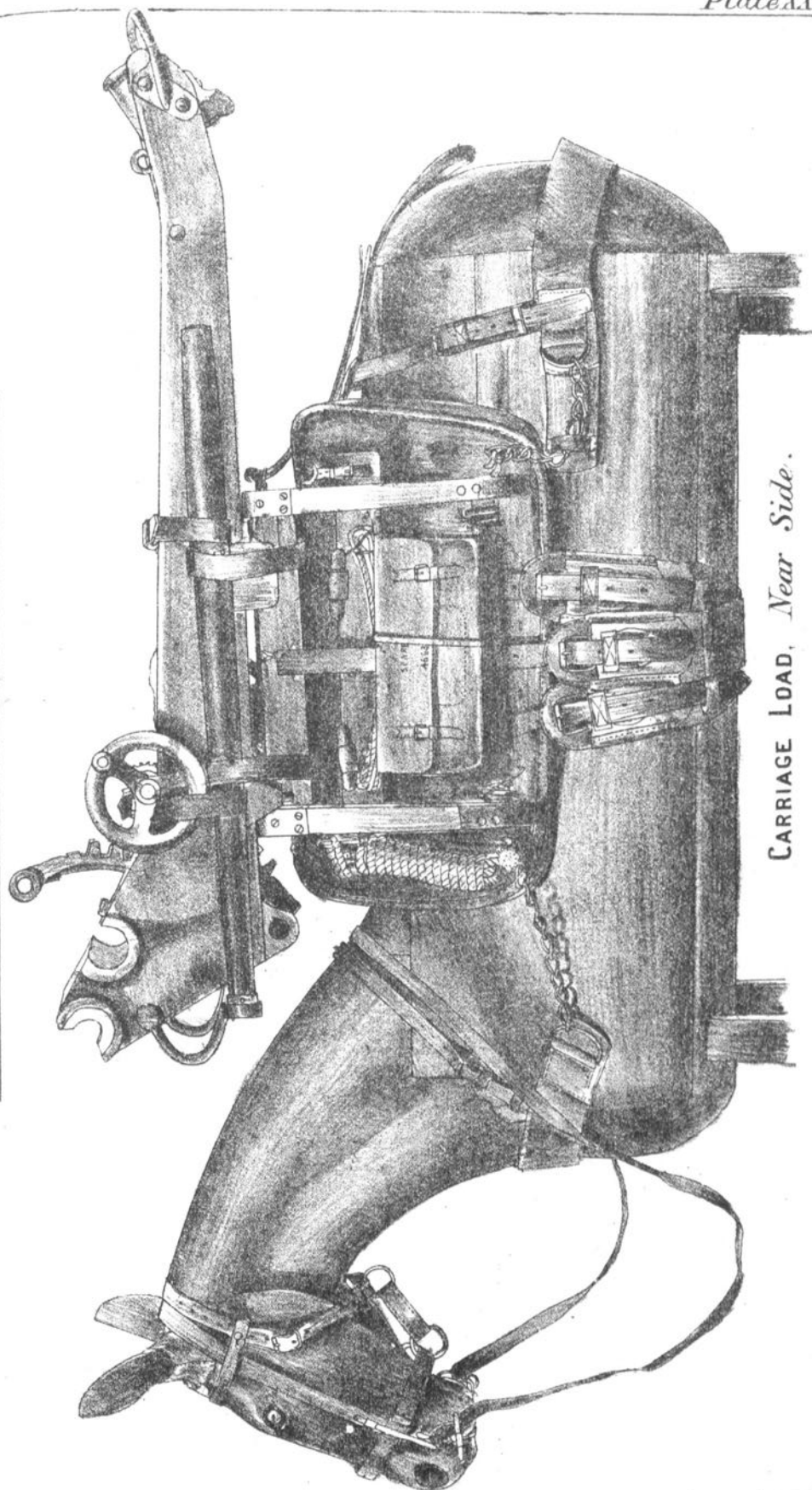
CRADLE LOAD, Near Side.

Q. F., 2-95 INCH MOUNTAIN EQUIPMENT.



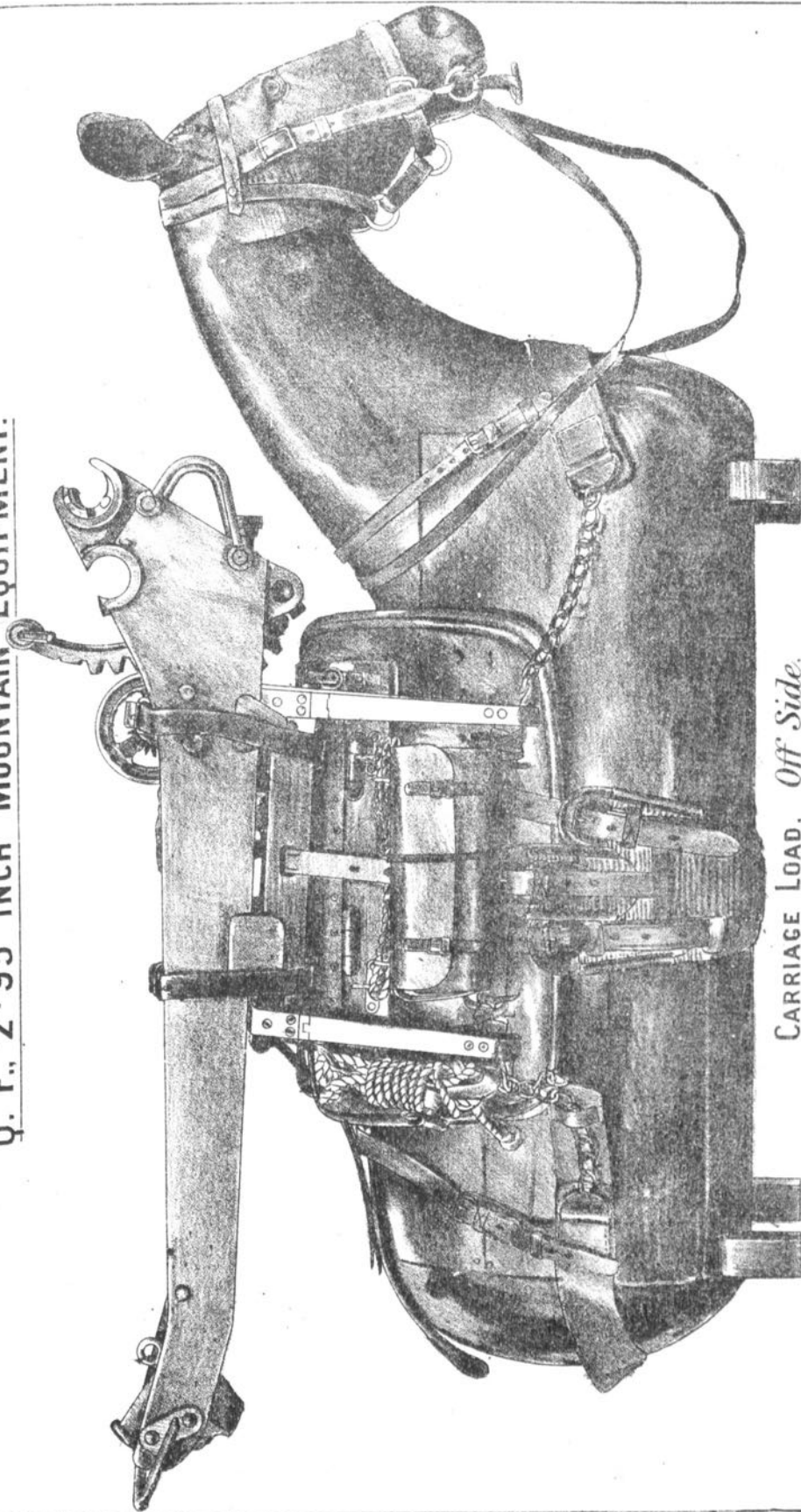
CRADLE LOAD, Off Side.

Q. F., 2.95 INCH MOUNTAIN EQUIPMENT.



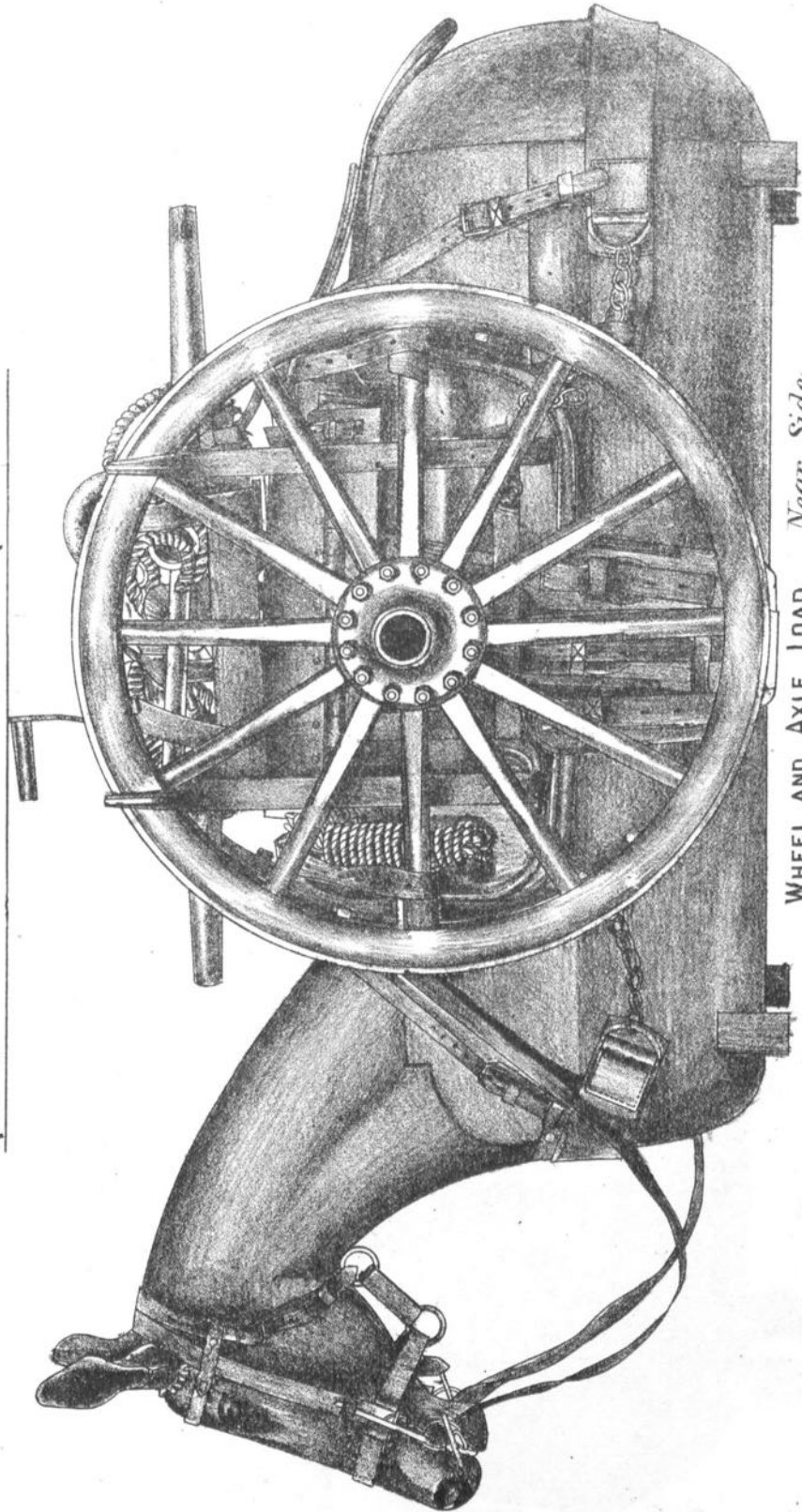
CARRIAGE LOAD, Near Side.

Q. F., 2·95 INCH MOUNTAIN EQUIPMENT.



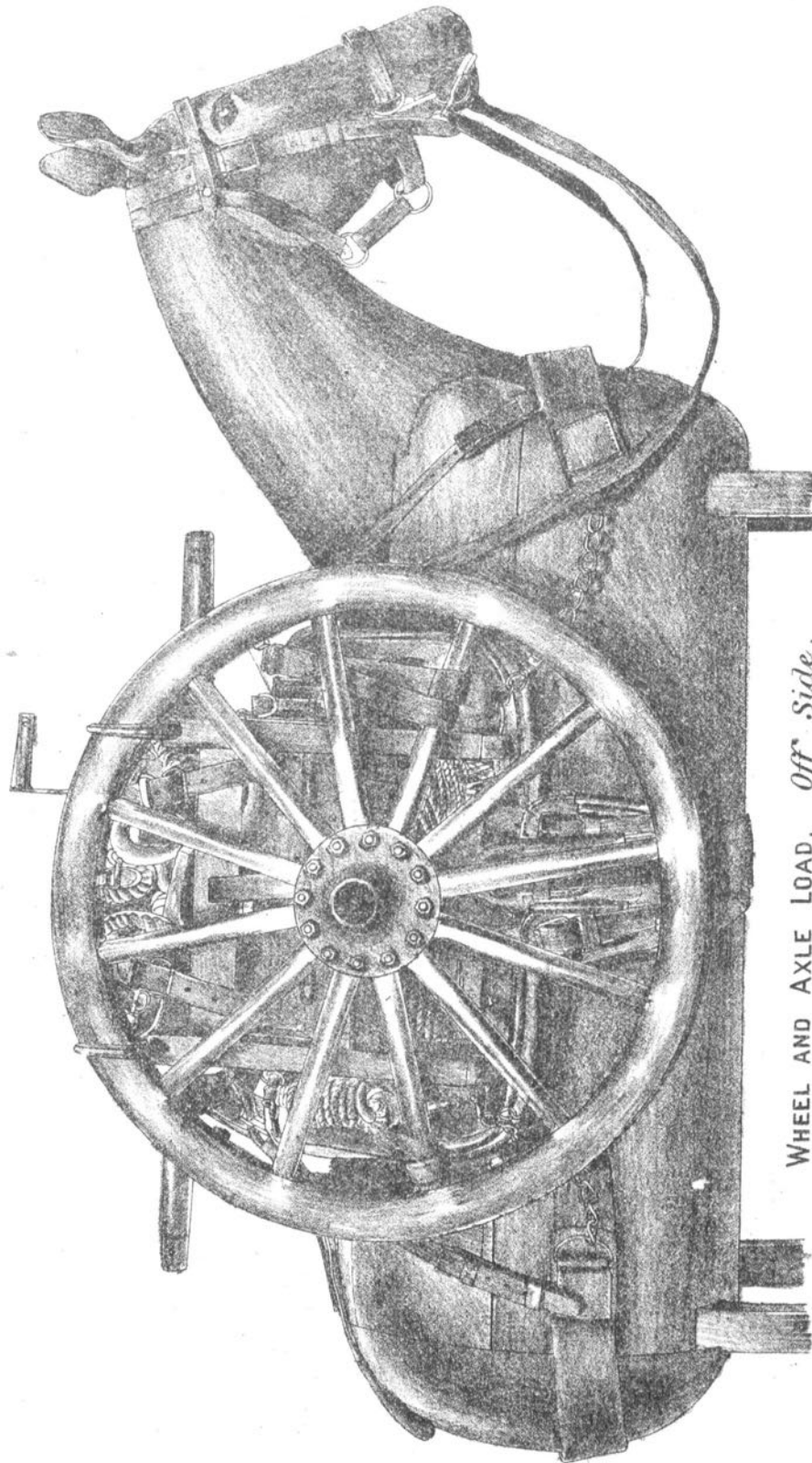
CARRIAGE LOAD, Off Side.

Q. F., 2-95 INCH MOUNTAIN EQUIPMENT.



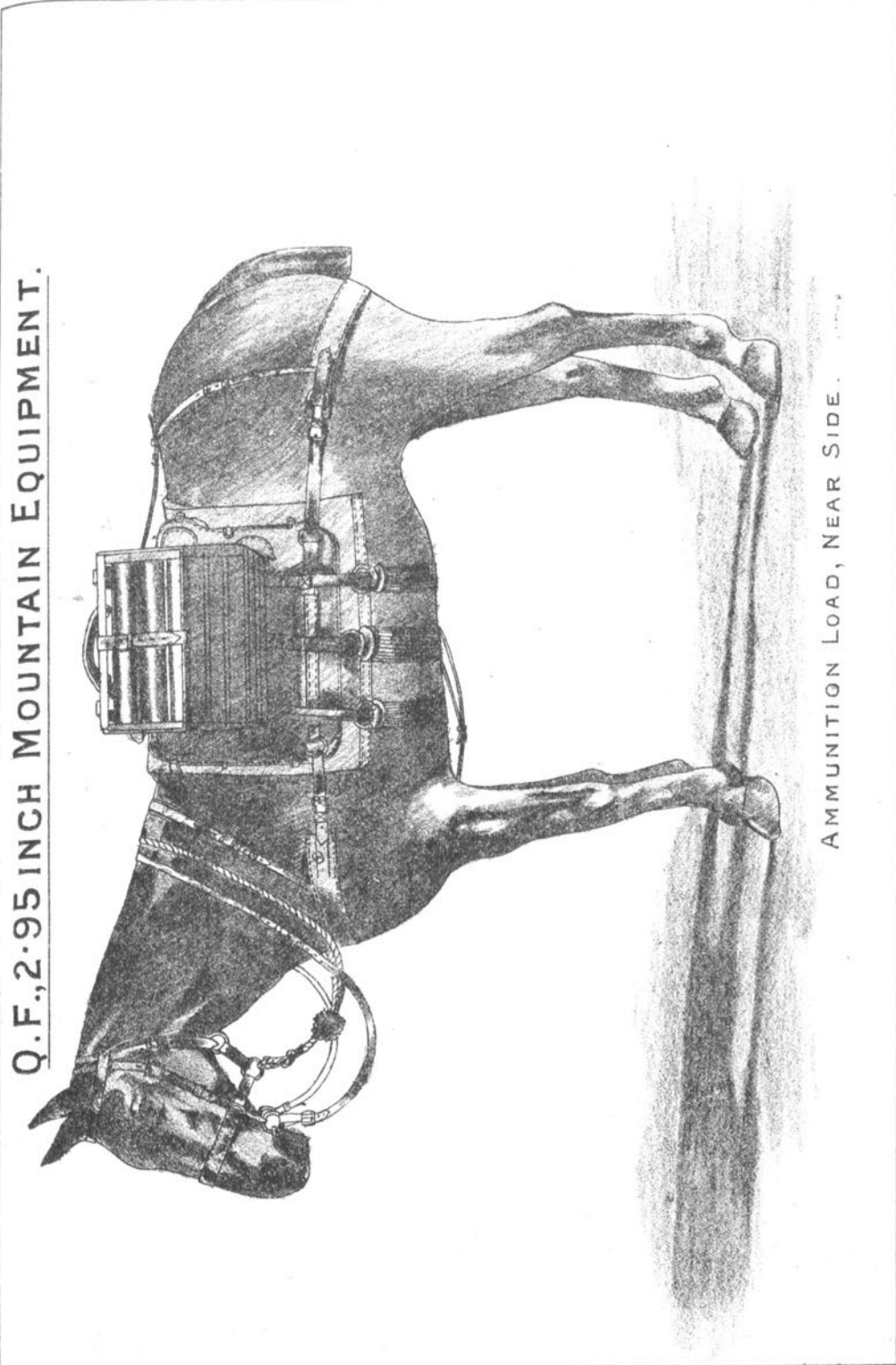
WHEEL AND AXLE LOAD, Near Side.

Q. F., 2·95 INCH MOUNTAIN EQUIPMENT.



WHEEL AND AXLE LOAD, Off Side.

Q.F., 2.95 INCH MOUNTAIN EQUIPMENT.



AMMUNITION LOAD, NEAR SIDE.